The Refrigeration Service Engineer

Vol. 8
No 6

JUNE • 1940

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June, 1940

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Official Organ
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Cover

This month's front cover shows a few of the contestants participating in the soldering contest conducted by the Mueller Brass Co., at a meeting in Flint, Mich. Details of the contest are on page 57

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High and Low Side Float Systems*

The first article of this series provides a review of low side floats and their application and although these systems are common in the field and are generally well known it is well to refresh one's memory as a prelude to the more complicated application of the high side float.

The high side float in recent years has returned to the spotlight after a period of comparative dormancy. The development of new auxiliary controls and the various methods of application make this type of system an interesting subject of discussion. It will be dealt with at some length in forthcoming articles.—EDITOR.

Description of Low Side Float

THE low side float feeds high pressure liquid into the evaporator in direct proportion to the quantity of vapor removed from the evaporator by the compressor, maintaining a constant level of liquid in the evaporator. A typical system is illustrated in Fig. 1. The space or header for the float assembly is located at the top of the evaporator. A bolt circle and pad is provided to receive the float valve face plate with the attached float and needle assembly. Two service valves are provided and are attached to the float valve face plate by suitable gaskets and screws. The lower service valve is the liquid cut-off valve; a wire mesh strainer is placed between this service valve and the valve seat to prevent foreign matter injuring the needle valve and seat. The top service valve is the suction cut-off valve. The opening from the top of the chamber through the face plate is provided with a suction tube. An oil return hole is drilled in the suction tube so that the oil or liquid refrigerant level cannot become higher than this hole.

A non removable float is used on Temprite instantaneous water cooler and beverage cooler evaporators. The construction of this float is illustrated in Fig. 3. A service valve is provided on the inlet and outlet. The float bucket or ball floats against a needle valve and seat assembly. The needle and seat assembly is serviceable by removing the cage containing these working parts and eliminates the necessity of removing the float bucket or ball.

By following the cycle, Fig. 1, you will note the compressor removes vapor through the suction tube, the liquid vaporizing by absorbing heat from the refrigerated space. The level of liquid is lowered allowing the ball to lower, opening the needle valve to the liquid line. An orifice and rate of flow is established into the evaporator equal to the rate of refrigerant removed by the compressor. When the compressor stops, evap-

* Courtesy of the Kelvinator Division, Nash-Kelvinator Corp.

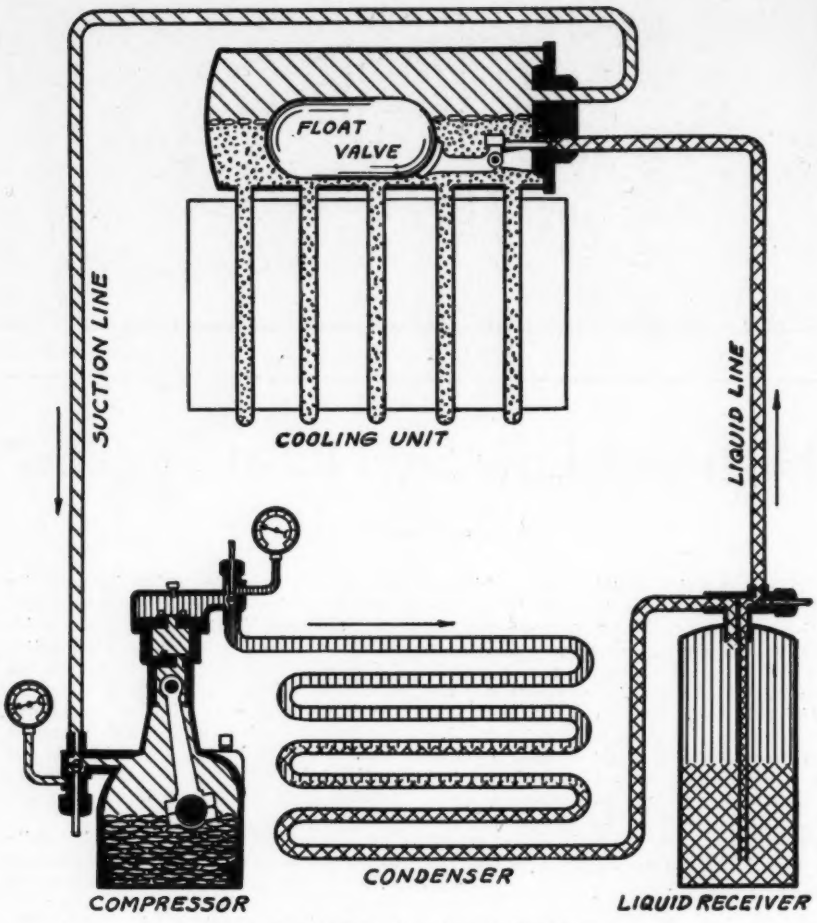


Fig. 1—A cycle chart of the low side float system.

oration ceases, the liquid level rises and the ball holds the needle against the seat.

Application

The low side float can be used in a single evaporator with a single condensing unit, in one or more evaporators connected in multiple with a single condensing unit or in combination with other evaporators using thermostatic expansion valves with a single condensing unit. It can never be connected in multiple with other evaporators that use capillary tube or high side float liquid feed.

The majority of low side floats are used on sulphur dioxide systems. They can however, be used with methyl chloride or Freon-12 refrigerants if the buoyancy of the ball and orifice size is suitable for the particular refrigerant. The satisfactory use of low side floats with methyl chloride and Freon-12 refrigerants will depend upon the design of the evaporator, its loading and the special precautions necessary to assure oil returning from the evaporator.

Service Characteristics

The symptoms of low side float trouble come under the following classifications.

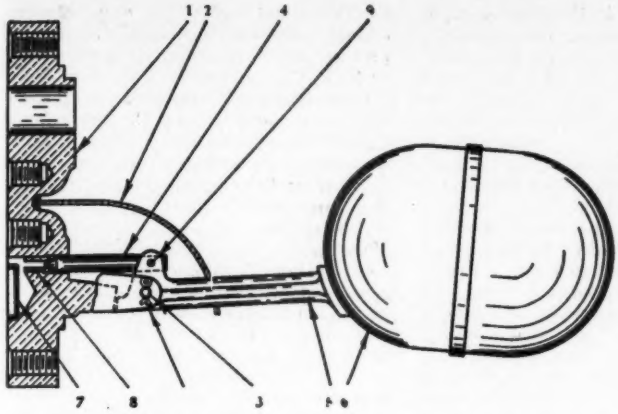


FIG. 2

1. Face plate.
2. Baffle.
3. Arm pin.
4. Valve.
5. Arm.
6. Float.
7. Strainer.
8. Valve seat.
9. Valve pin.
10. Valve cage.
11. Adjusting screw.
12. Valve pull-back.
13. Valve cage gasket.

(1) *Valve Seat Leak.* This can be caused by foreign matter on the seat or a seat cut due to passing refrigerant in the vapor state for some time. A leaky float will raise the level in the evaporator during the off cycle and if the system is controlled by a low pressure control, may result in short cycle with frosted suction line due to pull over of the surplus liquid.

(2) A float ball may leak liquid into the ball causing the ball to become heavy. This results in a higher than normal liquid level in the evaporator. If the ball fills sufficiently it will sink and hold the needle open. If the liquid level is raised slightly the suction line will frost.

(8) *Clogged Strainer.* A fine wire mesh strainer is located at the inlet to the seat. The strainer may be between the service valve and float face plate, or on early type floats it is in the inlet service valve fitting. A partially clogged strainer will starve the evaporator. This means that mostly vapor will pass through the valve. With a pressure type control, short cycling and poor refrigeration will result. With a temperature control, continuous operation and poor refrigeration can be expected. Refrigerant

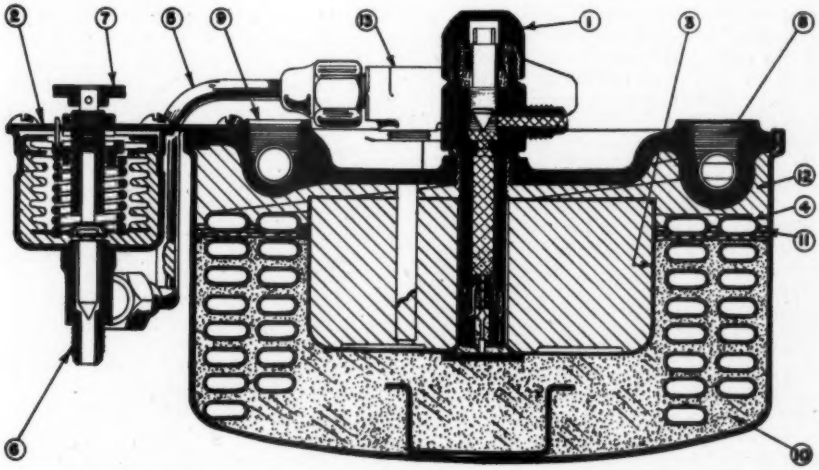


Fig. 3—The non-removable float arrangement used in the Temprite water cooler. In the illustration the float valve and its manual shut off valve are indicated at (1) and the float at (3).

entering the chamber in the form of vapor will aggravate oil logging of the evaporator.

(4) *Improper Calibration for Evaporator Loading.* If the float cuts off at too low a liquid level, the oil blanket becomes too heavy and an oil logged evaporator will result. If the cut-off level is too high the oil blanket will be too thin and drops of liquid will pull over into the suction line and a frosted line will result.

(5) A characteristic that may be analysed as float trouble is caused by liquid breaking up into vapor in the liquid line. This is usually caused by too small a liquid line, liquid line passing through hot locations in combination with low condensing pressure, or pressure loss due to the vertical lift of the liquid. Any of these causing vapor in the liquid line will tend to starve the evaporator with its resultant troubles.

Float Calibration

Low side float calibration (liquid level adjustment) depends on several conditions. Factory calibration is standardized to check for liquid level with a fluid which approximates the specific gravity of the usual mixture of refrigerant and oil in the evaporator. The cut-off point of the float is set for average conditions of operation and evaporator loading. In actual operation, vapor bubbles rising through the liquid reduce the effective specific gravity of the fluid in proportions to the violence of evaporation. As a result the factory calibration may cause a frosted suction line or a poorly balanced evaporator and compressor combination. An example of this condition is the use of a snap action valve in the suction lines on multiple systems. This type control may throw the capacity of a one hp. condensing unit on a small evaporator. The large compressor capacity causes such violent evaporation that the float ball will sink due to lower density of the liquid. On instantaneous water coolers if the rate of flow is greater than the capacity of the evaporator, the float will feed too much liquid resulting in a frosted suction line. This is not improper calibration but poor application of the equipment. Some of these poorly balanced installations may be improved from a service angle by providing a positive stop for the float travel to prevent the float from falling to the wide open position.

Float Repair

If the seat leaks or the float is improperly calibrated, the float must be removed from the evaporator. To remove the float, pump the refrigerant out of the evaporator requiring a float change. Always balance the pressure before removing the service valve or float. Care should be used when changing a float on a low temperature evaporator. If the evaporator is below the dew point of the air surrounding the opening, any air that enters the chamber will condense to moisture in the evaporator. Therefore use every precaution to prevent moisture entering the system.

The needle and seat is replacable in the field on most low side floats. The seat is pressed into the face plate and can be pushed out in a press and a new seat pressed into place. The new needle is put into place using new cotters and pins if necessary. Tap the needle lightly until the valve does not leak. To test for leaks, attach a refrigerant cylinder to the inlet, turn the float so the ball will hold the needle closed. Place refrigerant oil around the needle and seat and tap lightly until the bubbles disappear. If it is desirable to change the calibration do not bend the float arm more than 1/8 inch at a time then try the float for proper operation. This is the only practical method for field work. For shop work a calibration chamber is used to hold the calibration fluid. A calibration chamber can be easily made by cutting the top out of a discarded evaporator header. Use a float that is correct to establish the proper liquid cut-off level. Use a fluid in the chamber that will not injure the float parts or mechanism.

The Temprite float illustrated in Fig. 3 requires no calibration. To change the needle and valve cage assembly, permit a flow of warm liquid through the coil. Close the liquid line and pump out the refrigerant. Balance the pressure. Disconnect the liquid line and replace the cage assembly. Connect the liquid line. Loosen the suction connection before it enters the pressure reducing valve and purge air from the chamber. On some units an opening is provided in a service valve on the vapor outlet. A purge line can be attached to this opening and the air purged out through this purging line.

The refrigerant charge is not critical so long as there is sufficient liquid in the receiver to cover the liquid outlet. This is satisfactory for a minimum charge.

The liquid receiver may be one-half full of liquid refrigerant which would leave ample room to pump down the system. This can be considered a maximum charge.

To Be Continued

Engineered Air Distribution for Cooling

By D. J. STEWART *

UNSATISFACTORY distribution of cooled air has been the cause of many serious complaints and considerable antagonism to air conditioning in general. To the general public, the air *distribution* system is the air *conditioning* system; it is the only part of air conditioning with which they come in contact. No element of an air conditioning system can do more to compensate for short-comings of other elements of the system and, conversely, to upset an otherwise satisfactory installation.

There are unquestionably some instances in which the large quantity of air required and the shape and obstructions in the room do not permit completely satisfactory air distribution with any type of outlet, but extreme conditions of this sort are rare, and the great majority of installations having poor distribution are unsatisfactory not because of these conditions but because of improper location of the outlet or because of incorrect size or type of grilles or fixtures.

Some of the blame for this condition must be borne by the persons responsible for the selection of the grille or other type of outlet. However, until recently there have been available no performance data which would enable an engineer to make the proper selection. The best he could do was to rely upon his experience with installations in a somewhat comparable situation. While a great deal of engineering of various sorts uses successfully this very method of reasoning from experience, there are many cases, and this is one of them, where so many factors are involved and their interrelation is so complicated that solution of a particular problem by observation alone is extremely difficult.

Obviously, the production of a grille selection guide involves an extensive program of testing, even to obtain data for the grilles or ceiling outlets of one manufacturer. While a certain amount of generalization is practical, most published data suffer from too much generalization and some of it from failure to have the test conditions exactly simulate the conditions of actual use. The test room should be heated by some external means and cooled by the entering air, and suitable means should be provided for measuring the quantity and temperature of the entering air as well as the room tmperatures and velocities at any point in the room. A suitable test room is shown in Fig. 7 and Fig. 8. A ceiling outlet should be mounted on the ceiling in the same manner as it would be installed in actual use. Similarly, for side wall outlets, the latter should be installed actually in the wall of the test room at the various locations in which the unit would be normally used.

Standards of Comfort

Among any group of people there will be found a considerable variation in what is considered comfortable conditions. The research laboratory of the ASHVE has done much work on this subject and has published considerable data. One's feeling of warmth or coolness is affected by the room temperature, the air velocity, and the temperature of the moving air relative to the average air temperature in the room.

While the accompanying chart (Fig. 1), taken from an article on air distribution, may not be found to accurately agree with the findings of the ASHVE when these are completed and published, there appears to be little doubt as to the general form of such a family of curves as is shown. The velocities are averages obtained by the use of the kata thermometer, an instrument for measuring average velocity regardless of the direction.

Those who are in the habit of using a rotating anemometer and are not familiar with the kata thermometer should take particular notice that where there is any turbulence the kata thermometer reading will be higher than that obtained by the anemometer. The greater the turbulence the greater the disparity between the two measurements. In the extreme case of a velocity of 50 f.p.m. for ½ minute in one direction and ½ minute in the opposite direction, the kata thermometer would show an average of 50 f.p.m. while the rotating anemometer would show an average of zero.

* Manager, Electrical Division, Barber-Colman Company, Rockford, Ill.

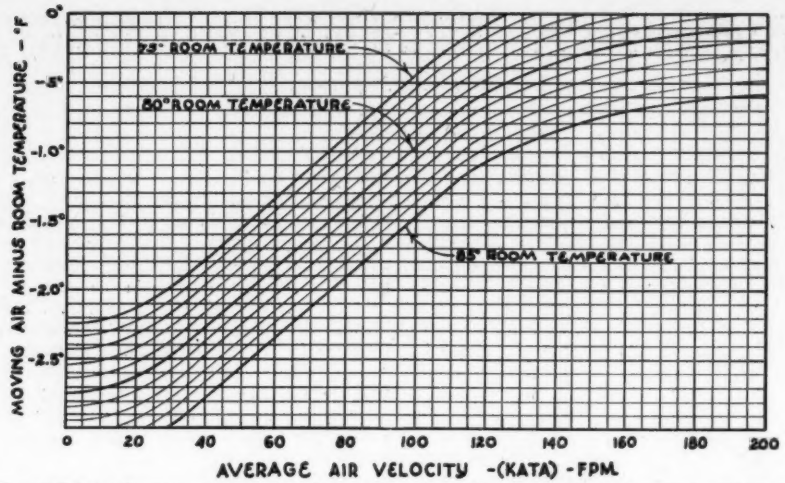


Fig. 1—Relation between maximum air velocity and moving air temperature for various room temperatures.

The reader will observe that the lines in Fig. 1 represent border line conditions; that is, that the areas to the right and below the lines represent unsatisfactory temperatures on the cool side. On the other hand, the areas to the left and above the lines, while they do not necessarily represent a comfortable room, do represent conditions where the occupants are not made uncomfortable by the air conditioning system. For example, in an 85 degree F. room at 60 f.p.m., an air temperature of 2.4 degree F. below the room temperature, or 82.6 degree F., would be just on the border line of too cool; whereas, in a 75 degree F. room at the same velocity, the temperature could only be 1.3 degree F. below the room temperature, or 73.7 degree F., before the occupants would begin to complain of drafts.

An air supply outlet fails to give satisfactory distribution under any one of the following conditions:

(1) Air drops into the occupancy zone with a velocity and temperature combination corresponding to, or worse than, the curve shown in Fig. 1 for the particular room temperature.

(2) Insufficient cooling air reaches some part of the room so that the room temperature rises at that location.

(3) The cooling air strikes a wall with such velocity that when it is deflected down that wall its temperature and velocity combination is higher than permitted by the comfort standards of Fig. 1.

(4) The maximum instantaneous velocity, measured by a vane anemometer, exceeds approximately 200 f.p.m. This condition, independent of the temperature, is uncomfortable merely because the motion is disturbing to the occupants. The reader's attention is directed to the fact that forced air circulation in a room is by a progression of whirls or turbulences, and that the maximum veloc-

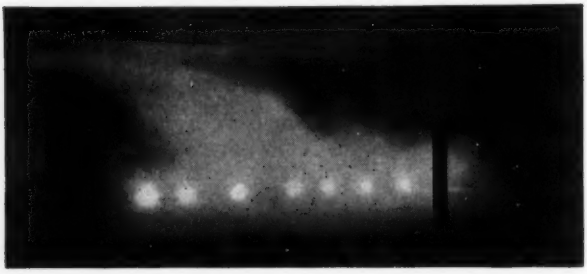


Fig. 2—Unsatisfactory air distribution because cooling air falls into the occupancy zone.

Fig. 3—Unsatisfactory air distribution because cooling air does not reach the rear wall.

ity may, therefore, greatly exceed the average.

Obviously, the necessity for observing the temperature and average velocity at a large number of points for every size of room, type of grille, velocity, etc., would prolong an investigation of comfort conditions indefinitely. However, an observer soon learns with experience to locate the worst places by inspection combined with approximate readings of temperature and velocity so that only in rare instances is it necessary to make more than a very few accurate measurements for each test. Since the objective of the testing program on which was based the grille selection method herein described was not to find all the combinations which would fail but rather to find at least one satisfactory outlet for every combination of room size, height, velocity, etc., a still further reduction in the necessary number of tests was possible.

Smoke as a Visual Check

A smoke test of each acceptable combination was made to guard against the possibility of a gross error. Photographs of smoke streams from a number of grilles and one ceiling outlet are shown (Figs. 2 to 6, incl.).

Grille No. 1 (Fig. 2) fails because the cool air drops into the occupancy zone. The air temperature and velocity combination within the occupancy zone is higher than that permitted by Fig. 1. Cool air in this particular instance probably reaches the rear wall in sufficient volume to accomplish the cooling there. Therefore, it cannot be said that the *throw* of this grille is too short. In this instance a higher velocity would probably not improve matters, merely causing the unsatisfactory zone to move further from the outlet. A decrease in volume would, if carried far enough, overcome the difficulty of dropping into the occupancy zone, but might not reach the rear wall. However, a combination of decreased volume and higher velocity would probably be satisfactory. A different type of grille with a somewhat greater upward deflection would also, in this instance, be satisfactory even with the same volume. However, if the ceiling were a little lower, no single grille would deliver as large a volume as shown with satisfactory air distribution.

Grille No. 2 (Fig. 3) fails because the cool air does not reach the rear wall with sufficient velocity. A higher outlet velocity would increase the volume reaching the rear wall, as would also a lower aspect ratio,[3] a greater volume, or perhaps a different type of grille. It is possible that some of these suggestions might introduce other difficulties. For example, too much increase in volume would cause the air stream to drop into the occu-

[3] Aspect ratio is the ratio of grille width to grille height.

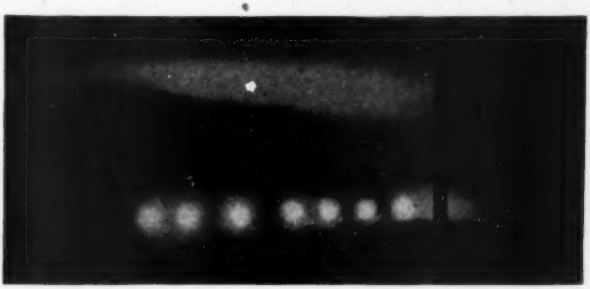


Fig. 4—Unsatisfactory air distribution because cooling air reaches the rear wall with excessive velocity.

Fig. 5—(Left) Satisfactory air distribution from a side wall outlet.

Fig. 6 — (Below) Satisfactory air distribution from a ceiling outlet.

pancy zone with too high a combination of temperature difference and velocity.

Grille No. 3 (Fig. 4) fails because the cool air reaches the rear wall with too high a velocity. A lower velocity, a greater aspect ratio, less volume, or a different type of grille is indicated.

Grille No. 4 (Fig. 5) gives satisfactory air distribution from a side wall outlet under the particular set of conditions existing.

Fig. 6 shows satisfactory air distribution from a ceiling outlet under a particular set of conditions. The average velocity down the side wall is 50 f.p.m.

The Testing Program

The testing program determined by the foregoing considerations was undertaken and has been completed in the rooms shown in the photographs (Figs. 7 and 8). The smaller of these rooms (Fig. 7) was used for the lower ceilings and shorter room lengths, and the other (Fig. 8) for the higher ceilings and longer rooms. The work was carefully laid out and systematized to avoid duplication and to reduce as far as possible the frequency of changes in the room structure itself, but in spite of these efforts the program entailed many months' work by several men.

With slight modification, the testing method and program was followed with ceiling outlets as with sidewall grilles. Fig. 6 shows a ceiling outlet in the test room.

Presentation of Test Data

Based on these tests, sufficient data were obtained to enable the publication a year ago of recommendations for ceiling heights up to 12 ft., room lengths up to 50 ft., air volumes to approximately 1000 c.f.m. under most conditions, and velocities up to 1400 f.p.m. Since that time the work has been extended to include much higher ceilings, room lengths up to 100 ft., air volumes up to approximately 3000 c.f.m., and velocities as high as 2600 f.p.m.

A sample page of the data for side wall outlets, slightly modified for illustrative purposes from the printed form for use by the field personnel, is shown in Table 1. This particular table is for a velocity of 700 f.p.m., a room height of 9 ft. 6 in., and a mounting height of 7 ft. 6 in. The figure in the left hand column of each pair is a symbol for a certain type of grille (fictitious in this case) and the letter indicates the approximate aspect ratio: *L* for aspect ratios below 3 or nearly rectangular; *M* for aspect ratios between 3 and 7; and *H* for aspect ratios greater than 7.

Accompanying the book of data, made up of approximately 150 similar pages for vari-

Fig. 7—Test room for low and moderate ceiling heights and room lengths to 50 feet.

ous velocities, room and mounting heights, is a chart (Fig. 9) from which one may select the nominal size of grille corresponding to a recommendation from the data page.

Similarly, tables were made up for ceiling outlets on the same basic idea, differing somewhat, from the side wall grille tables.

Factors Affecting Grille Performance

The following factors (and probably others) must be considered as variables of which grill performance is a function:

1. Face velocity
2. Air volume (c.f.m.)
3. Noise
4. Aspect ratio
5. Grille type and fin arrangement
6. Grille height
7. Distance of grille from ceiling
8. Length of throw
9. Temperature differential
10. Width of room
11. Temperature of walls (especially opposite wall)
12. Location of return grille
13. Type of ceiling—smooth, rough, or beamed
14. Obstructions such as columns, light fixtures, furniture, etc.

The first eight factors are variable by the very nature of the problem and have been found by test and experience to be of such importance they cannot be neglected. Furthermore, the effect of these factors is sufficiently complex so that the judgment of the average user cannot be depended upon to produce satisfactory results. It is these factors which enter into the tables of which Table 1 is a sample. The last six factors involve some judgment on the part of the user of the data in cases where they differ widely from the condition under which the testing was done.

Temperature Differential

The temperature difference, item 9, used in all the testing was 20 degrees F., but enough of the data was checked to be certain that it is safe at 25 degrees F. differential. Differences less than 20 degrees F. are safe.

For item 10, charts or tables showing the horizontal distribution for various velocities with each type of grille are sufficient to

Fig. 8—Test room for higher ceilings and room lengths to 100 feet.

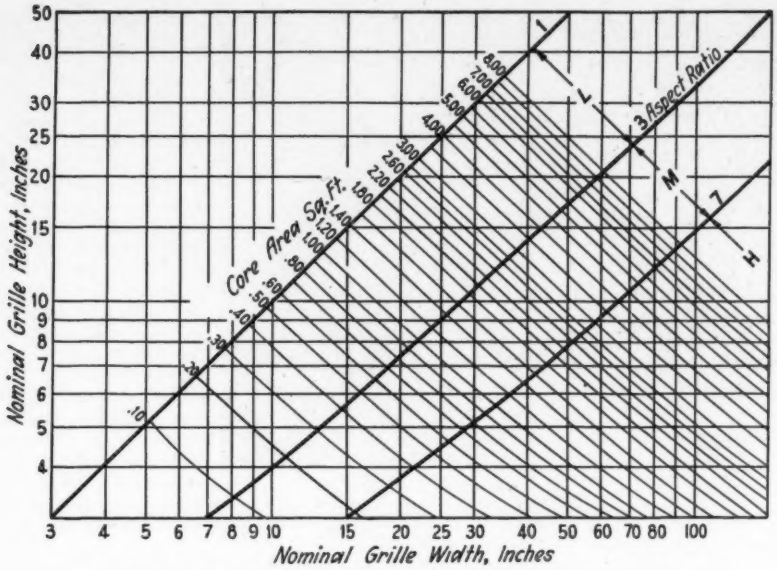


Fig. 9—Relation between nominal dimensions, aspect ratio and volume.

enable an engineer to determine whether the spread is great enough to fill the room and yet not great enough to cause high velocities down the side walls.

Item 11 involves some judgment by the user of the tables. For example, if the wall opposite the grille is the principal source of heat, it would be advisable to have the cooling air strike this wall with a higher velocity. This can be accomplished by selecting a grille which would give suitable distribution in a room slightly longer than the actual room length.

Item 12 also requires some judgment unless the return grille is located on the same wall as the outlet. For good distribution in most rooms, a location on or near the wall where the outlet is located is practicable as well as desirable.

Beamed ceilings (item 13) present one of the most difficult problems, particularly if the beams are of considerable depth. Every effort should be made to place the grille on a wall which permits the air to be blown parallel with the beams.

Obviously the field engineer must use his judgment with respect to item 14.

Nothing has been said concerning the approach conditions just back of the grille, but it must be apparent that the air should approach the rear of the grille at approximately right angles and with a reasonably uniform distribution if results are to be expected in accordance with the selection data. For structural reasons, poor approach conditions cannot always be avoided, but suitable adjustable vane dampers are available which may be located behind the grille and can be adjusted to produce the desired approach conditions.

An Illustrative Problem

To illustrate the use of Table 1, typical of all such cases, consider the following problem. The volume of air required, temperature differential, shape and size of room, including the ceiling height and *throw*, will be specified. The elevation of the grille may also be fixed by the architect. The performance of a given grille will vary considerably depending, particularly in the low ceiling heights, upon the difference between the elevation of the grille and the height of the ceiling. The normal noise level of the space will either be known or can be estimated from tables giving acceptable or usual noise levels in various types of buildings.

Example: Suppose that a grille is to be selected for an office (a) 20 ft. wide and 35 ft. long and which requires an air volume of 850 c.f.m with a temperature differential of 20 degrees F.; (b) that the office noise level

TABLE 1—SAMPLE TABLE SHOWING METHOD OF GRILLE SELECTION

THIS TABLE APPLIES ONLY TO 700 FT PER MIN AIR VELOCITY, A ROOM HEIGHT OF 9½ FT. AND A GRILLE MOUNTING HEIGHT OF 7½ FT

AIR DELIVERY, C.F.M.	CORE AREA OF GRILLE, SQ. FT.	AIR THROW, FEET															
		12		14		16		20		25		30		35		40	
		TYPE	ASPECT RATIO	TYPE	ASPECT RATIO	TYPE	ASPECT RATIO	TYPE	ASPECT RATIO	TYPE	ASPECT RATIO	TYPE	ASPECT RATIO	TYPE	ASPECT RATIO	TYPE	ASPECT RATIO
50	.07	..	....	C	H	..	....	..	....	..	....	..	....	..	....	..	....
100	.14	....	....	B	H	....	....	....	....	....	....	..	....	....	....	....	....
150	.21	....	....	c	h	....	....	....	....	....	....	....	....	....	....	....	....
200	.28	....	....	....	....	B	H	D	H	....	....	..	....	....	....	....	....
250	.35	....	....	....	....	E	H	B	M	....	....	A	L	..	..	....	....
300	.42	....	....	....	....	e	h	..	....	....	....	B	L	....	....	....	....
350	.50	....	....	....	....	b	h	....	....	D	M	....	....	A	L	....	....
400	.57	....	....	....	....	....	....	....	....	B	M	....	....	B	L	....	....
450	.64	....	....	....	....	....	....	E	H	..	....	....	....	....	....	B	L
500	.71	....	....	....	....	....	....	B	H	..	....	....	....	....	....	A	L
550	.78	....	....	....	....	....	....	....	....	....	....	A	M	....	....	....	....
600	.85	....	....	....	....	....	....	....	....	....	....	B	M	....	....	....	....
650	.92	....	....	....	....	....	....	b	h	....	....	....	....	A	M	....	....
700	1.00	....	....	No Recommendation Made				....	....	....	....	....	....	B	M	....	....
750	1.07	....	....	for Conditions in This Region				....	....	B	H	....	....	....	....	B	M
800	1.14	... Use Another Velocity, Quantity per Outlet, Throw, ...								....	....	....	....	....	....	A	M
850	1.21	.... or Mounting Height, and See Appropriate Table								..	....	....	....	....	....	....	....
900	1.28	....	....	....	....	....	....	....	....	b	h	....	....	....	....	....	....
950	1.35	....	....	....	....	....	....	....	....	....	....	....	....	....	....	b	m
1000	1.42	....	....	....	....	....	....	....	....	....	....	B	H	....	....	....	....
1050	1.50	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
1100	1.57	....	....	....	....	....	....	....	....	....	....	....	....	B	H	....	....
1150	1.64	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
1200	1.71	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
1250	1.78	....	....	....	....	....	....	....	....	....	....	b	h	b	h	....	....
1300	1.85	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
1350	1.92	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
1400	2.00	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....

NOTE: Types A, B, C, D and E are fictitious types for illustrative purposes only. Where type and aspect ratio are shown in small letters as a, b, c, d or e, the indicated type is on the borderline. In this table the heavy horizontal lines indicate the range over which a given grille or grilles is suitable. For example, under a throw 35 ft., a B-H grille is suitable from 750 to 1100 c.f.m. Between 450 and 700 c.f.m. *either* an A-M or a B-M grille is suitable.

of 40 db may not be noticeably exceeded; (c) having a ceiling height of 9 ft. 6 in.; (d) a grille mounting height of 7 ft. 6 in., placing the center line of the outlet 2 ft. below the ceiling; and (e) the required throw to be 35 ft.

SOLUTION: The maximum velocity permissible from the standpoint of noise must then be determined. A method for such determination has been published.[4] According to that method, the maximum velocity in this instance with a particular type of grille and for 800 c.f.m. is 700 f.p.m.

Table 1, since it covers the ceiling and mounting heights and velocity of the problem, represents the page the user would refer to in solving the given problem.

In the column corresponding to a throw of 35 ft. and opposite 850 c.f.m., the given volume, note that a type B grille with a high aspect ratio will be satisfactory. The short bold-faced horizontal lines which appear in each column under throw indicate extent of the range of air volumes over which the grille or grilles recommended apply. This grille, as shown in Table 1, is suitable for a throw of 35 ft. over a range of from 750 to 1100 c.f.m. at 700 f.p.m face velocity.

According to the table, 850 c.f.m. at 700 f.p.m. requires a core area of 1.21 sq. ft. The nominal dimensions of a suitable grille of high aspect ratio is now determined by means of Fig. 9. Any type B unit[5] which lies on the line corresponding to 1.21 sq. ft. in the *H* aspect ratio region will answer requirements. A 46 in. x 5 in. unit is one of the several sizes that might be selected; 37 in. x 6 in. and 60 in. x 4 in. units are others within the same classification.

Had the room been shorter, so that a throw of 25 ft. was required, no grille in the table would have given satisfactory distribution. It would then have been necessary to have used a lower velocity which, of course, would still meet the noise requirement. Actually the highest velocity which would permit the distribution of this much volume from a single outlet in a room 25 ft. long is 500 f.p.m. at which velocity the same type of grille would be satisfactory, but naturally a larger size would be required.

[4] The Noise Characteristics of Air Supply Outlets, by D. J. Stewart and G. F. Drake (A.S.H.V.E. Journal Section, "Heating, Piping and Air Conditioning," Jan., 1937, pp. 65-70).

[5] Type A, B, C, D, etc., differentiates among different fin arrangements.

Second Article

Moisture Treatment Methods

THE first article of this series which appeared in the May issue, outlined field and service methods of applying Thawzone. Its use, however, is not confined entirely to the service field.

Factory and Installation Methods

(a) It is becoming common practice to use Thawzone as a preventive at the time original installations of new or rebuilt equipment is made. In such cases Thawzone may be placed in the system in the field after it has been tested but before it has been evacuated. The normal field vacuum which is applied seldom exceeds 25 inches which will not remove the Thawzone unless excessive heat is applied. Thawzone should preferably be placed in the crankcase so that it will not be removed by purging. Of course, it can also be added to a system after it has been placed in operation by any of the methods outlined.

(b) Thawzone can be added to new machines in the factory prior to shipment. Likewise it may be added in the shop where machinery is rebuilt before it is sent out for re-installation. Most compressor and fixture manufacturers who are adding Thawzone apply it after the compressors are baked and dehydrated. After units are dehydrated, some manufacturers apply the oil simply by opening the oil plug and pouring it in, and if so, Thawzone can be added at the same time. Another manufacturer who applies the oil under pressure and allows the vacuum which remains in the machine after dehydration to suck the oil in is using a different method. There is a place in his charging and testing procedure where the unit is pumped down to atmospheric pressure (one to three pounds). Thawzone is easily added via the oil plug hole at this point. It is preferable to keep the Thawzone in the crankcase rather than in the receiver because it is less likely to be purged out when the system is installed. In either of the above methods Thawzone can be kept in and applied via a dropper bottle such as that shown in Fig. 2. When the units are installed in the field, if it is necessary to add more refrigerant, a corresponding additional amount of Thawzone should be added.

Quantity to Use

One-eighth ounce per pound of refrigerant is an average dose. Smaller dosage may prove successful. Larger doses are not harmful. One-eighth ounce per pound is about 1 per cent. In large flooded evaporator systems one ounce per motor horsepower may be adequate.

Thawzone and Cartridge Driers

Many questions have been asked in regard to the proper fields of application of Thawzone and of cartridge driers. The following discussion, while presenting our point of view, is developed from the basic principle that Thawzone is suitable for taking care of the ordinary amounts of water which may be in the system, but that excessive amounts, one-half of one per cent or more, should be handled by other means, such as recharging or the use of large size cartridges.

All solid drying agents now on the market remove Thawzone to a certain extent. Therefore, it is not advisable or economical to use both Thawzone and a cartridge drier at the same time. The use of a filter is desirable on any type of system, and it is to be noted that a cartridge drier functions in this manner to a considerable extent.

For service work where a job has drawn in large quantities of moisture and/or air, one procedure which has worked successfully, is to install a cartridge drier using one of the well known drying agents on the market. It should be allowed to remain until it is reasonably sure that the drier has done the job intended and has reduced the water content to a nominal amount. The

* From copyrighted bulletin "Modern Dehydration" by Highside Chemicals Co.

drier is then removed and a charge of Thawzone added. Sometimes if the drier cartridge is of the flanged type, the drying agent can be removed and a filter element substituted. The above method results in a dry system in a short time. In addition, the advantages of Thawzone remaining in the system as a preventive of acid are capitalized by this procedure.

It should be noted that if the installation is such that Thawzone can handle it right from the start, further drying means are an unnecessary cost. This, as pointed out above, should be the case on almost all jobs where reasonable care and workmanlike technique have been employed.

Effect on Various Materials

1. Neoprene—There are a number of neoprene compounds which are used in refrigeration work. Some of these are covered by patents. Not all neoprene compounds are suitable, as there are some which contain material extractable by methyl chloride or Freon. However, neoprenes of the proper grades have been tested in Thawzone, full strength, for approximately 18 months. The neoprenes underwent no change, while the Thawzone took on a slight yellow color and there was a small amount of sediment. Neoprene tested in 1 per cent and three per cent Thawzone-refrigerant mixtures was also in perfect condition and there was practically no discoloration of the refrigerant. Thawzone has been used in many units containing neoprene seal rings, neoprene gaskets, and check valves containing neoprene seating rings. In every case the results have been entirely satisfactory.

2. Seals—Thawzone-refrigerant mixtures have no harmful effect on any type of seal which is at present used. One manufacturer of compressors has reported a correlation between seal leakage and the amount of acidity in the system. Thawzone has improved seal performance in some cases by its action in keeping the refrigerant and oil neutral.

3. Methyl Chloride With Acrolein—Acrolein is a tracer gas occasionally used in methyl chloride. Its powerful odor makes a leak immediately noticeable. Thawzone used in such systems converts the Acrolein to a form which is odorless and thus destroys its usefulness. Althought no other harmful effect will occur, Thawzone is not recommended for use with Acrolein methyl chloride.

4. Sulphur Dioxide—Thawzone was not designed for and should not be used with sulphur dioxide. The addition of Thawzone to a sulphur machine could not possible cure a moisture condition. However, Thawzone can and should be used to eliminate traces of SO_2 in machines converted from SO_2 to Freon or methyl chloride.

5. Resistoflex—This is a synthetic material which is coming into use for gaskets and charging hose linings. Full strength Thawzone tends to harden it slightly but otherwise has no effect. Thawzone-refrigerant mixtures have no action on it. (Duration of test—six months.)

6. Enamel Wire—Older types of enamel wire used in hermetic units have a special natural resin coating. More recently wire coated with a new synthetic enamel has been successfully used in direct contact with refrigerant. These materials are inert to full strength Thawzone as well as Thawzone-refrigerant mixtures.

7. Gasoila—This is a pipe joint compound frequently employed in refrigeration work.

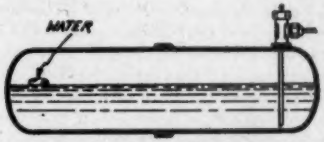


Fig. 11—Schematic drawing illustrating excess water in receiver of Freon unit.

Thawzone-refrigerant mixtures are without effect. Some manufacturers coat the inside of compressor crankcases with this material. Thawzone can be successfully used with such machines, provided the recommended proportions are not greatly exceeded. Thawzone has been used in thousands of units employing Gasoila in joints.

8. Cotton—Degummed cotton is also used for insulation on wires in hermetic units. Full strength Thawzone tends to reduce the tensile strength of the cotton somewhat. Thawzone-refrigerant mixtures are without effect. The electrical insulation resistance of both enamel and cotton covered wire has been tested after exposure to Thawzone-refrigerant mixtures and very little change found.

9. Filters—Thawzone-refrigerant mixtures are without effect on ordinary metal filters and have been successfully used with both asbestos and felt filters. There is some question as to whether felt is a proper material to have on a refrigeration system. Thawzone does not aggravate the situation.

10. Methyl Formate — Methyl formate (boiling point 88.7°F) is a refrigerant used in some domestic units. Thawzone should never be used with it.

11. Aluminum—Thawzone has been used successfully in conjunction with household F-12 units employing aluminum lowsides. Recommended proportions (one per cent) of Thawzone to refrigerant should not be greatly exceeded on units having aluminum lowsides. Certain refrigerants are not recommended in conjunction with aluminum and the addition of Thawzone naturally will not change matters.

When to Use Thawzone

Thawzone is used in such small proportions, one per cent or less, that with very few exceptions it can be applied to almost any job. There are, of course, some types of jobs in which it should be apparent that Thawzone cannot effect complete cure, although it may be successful as a temporary remedy.

1. Units Containing Alcohol—The service man often runs into a system which has been previously serviced by others. It is possible that such a unit may have developed moisture trouble in the past and that alcohol or other anti-freeze was added in an effort to cure it. Such cases, especially if they have been running for some time, are undoubtedly corroded internally. The refrigerant still contains water, and acid is almost certain to be present. When freeze-ups occur in such a system, they are usually due, in part, to sludge as well as actual ice formation. The addition of Thawzone will keep such units operating in an emergency. However, Thawzone cannot correct the corrosion which has already occurred and if large amounts of water and anti-freeze are present, it cannot completely inhibit further corrosive action. The presence of alcohol or other anti-freeze can often be detected by cracking a valve or fitting on the liquid line and smelling the refrigerant. A foul alcohol odor is usually indicative of the condition just described. As a further check, inspection of the inside of a piece of the suction tubing or of the valve plate will clearly show if really bad corrosion (with or without copper plating) has taken place. If conditions are very bad, Thawzone can be used as a temporary measure but the proper procedure is either to dump the entire charge of refrigerant and oil or to use the drier technique already outlined. In cases like this the oil is usually in pretty bad condition and a special point should be made to change it if at all possible.

2. Sludge, Ice, and Expansion Valves—There is little doubt that literally thousands of expansion valves have been removed as defective and replaced when the trouble was due to ice, or to sludge at the needle or the strainer. When an expansion valve appears sluggish, or blocked, the strainer should be inspected and cleaned. Thawzone should be added. If the trouble is ice or small amounts of sludge, Thawzone will put the unit back into operation. See below for procedure when large amounts of sludge are present.

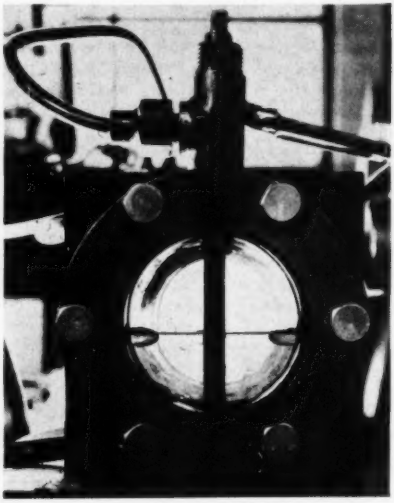


Fig. 12—This is an unusually interesting photograph of a receiver with glass ends which permits observation of the refrigerant during operation. The thin horizontal line in the glass is the level of Freon in the receiver. What appears to be bubbles at each end of the line are actually large drops of water floating on top of the Freon.

3. Conversions From Ammonia To Freon—It is sometimes necessary to convert ammonia units to Freon. Ammonia machines usually contain some water and oil sludge. Considerable emulsification of the oil has also occurred. The entire units should be cleaned as thoroughly as possible, preferably by flushing with a solvent. Benzol is recommended for flushing rather than carbon tetrachloride. After this, units should be evacuated and baked, if possible, or at least heated under vacuum and the new charge of Freon plus new oil added. Thawzone should be used, and both liquid line and suction line

strainers employed. The strainers may need cleaning once or twice, as the Freon tends to loosen scale, etc., in parts of the system. This technique has been successfully employed in a number of cases. If trouble is experienced on such a job, to which no Thawzone has been added, Thawzone and strainers may save costly recharging.

4. Freeze-ups Shortly After Servicing a Unit—Freeze-ups often occur when new gas is added to a machine or when some other service operation is performed. Very frequently after such servicing, a unit which had been operating successfully for a month or two or even a year may suddenly freeze-up. This, of course, may be due to the addition of wet refrigerant or oil, but is more likely due to other factors. Very often moisture which may have frozen out in the low side or trapped out in the receiver may again get into circulation as a result of the servicing and cause trouble. For example, in a Freon machine, water, which is lighter than Freon may trap out in the receiver and stay there. (See Fig. 8.) Likewise in a methyl chloride system water which is heavier than the methyl chloride may trap at the bottom of the receiver if the latter happens to be tilted so that the water cannot run down toward the refrigerant take off tube. Addition of gas or oil may stir up the contents of the receiver so that this excess water gets into circulation and causes a freeze-up. Addition of Thawzone when adding gas or oil will prevent such an occurrence.

Concluded

Refrigerant Transfer Unit

By E. S. DIGGLE
Henry V. Dick Co., Charlotte, N. C.

THIS system of refrigerant transfer is one of the cheapest to construct and provides much faster operation over other systems not employing refrigeration in the transfer lines.

The evaporator is constructed of three heat interchangers at least three feet long, connected in series. The inside tube of the interchangers is ⅝ inch diameter and the outside tube ⅞ inch diameter. The refrigerant from the condensing tube passes through the expansion valve and through the inner ⅝ inch tube. The refrigerant to be transferred enters the lower, side outlet, passing through the outer ⅞ inch tube, and leaves the interchanger through the upper side outlet. Each kind of gas transferred has a separate tube.

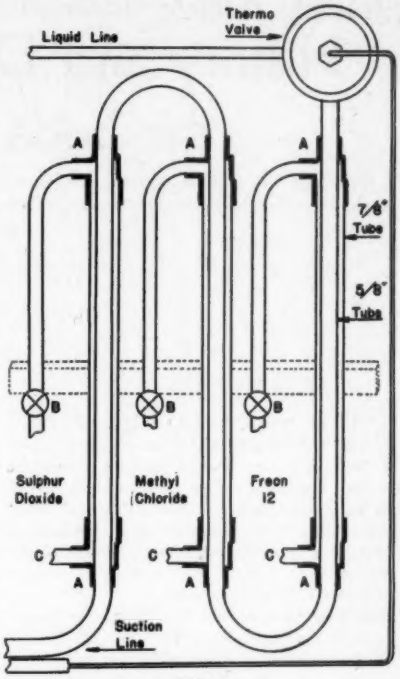


FIG. 1
A—Heat interchanger tees.
B—Shut-off valves and flexible hose charging connections.
C—⅜ inch lines to refrigerant cylinders.

A solenoid valve should be installed in the liquid line to the expansion valve and controlled by a manual off and on switch. A pressure switch controls the compressor.

After the entire evaporator, as shown in Fig. 1, is completed, it can be enclosed in a suitable cabinet and packed with insulation. All connections can be mounted on the outside.

J. D. Wright
Colorado

THE REFRIGERATION SERVICE ENGINEER is the best little helper I know.

H. K. Finch
New York

This is a very helpful trade magazine and should be read by every one rendering Refrigeration service.

Fourth Article *(Concluded)*

History and Development of the Soda Fountain

In this issue the author continues with his description of circuits employed in some of the better known soda fountains of today. Previous articles described older models.

By A. F. McMAHON*

Russ Circuit

THE ice cream section of the soda fountain is refrigerated by means of a coil of 5/8 inch diameter copper tubing, wrapped around and soldered to the metal lining of the ice cream jacket. This coil is imbedded in a solidified asphalt emulsion, eliminating the necessity of using brine. In the phantom view of Fig. 17, the method of wrapping this coil is illustrated.

As can be seen by following the wrapping of the coil, shown on Fig. 17, the expansion tubing enters the ice cream jacket approximately 8 inches from the top of the tank. The coil completely encircles top section of ice cream jacket, extending up to the top of the compartment. From this point the coil drops to the bottom of the extreme end wall and is then coiled up this wall to within 8 inches of the top. At this point the coil again drops to the bottom and is wrapped up the rear wall again, to within 8 inches of the top. At this point the coil leaves the tank and is joined to the suction line.

Due to the method of wrapping the ice cream jacket refrigeration coil described above, different temperatures can be maintained in the various portions of the ice cream jacket to fit the specific requirements of any customer. If a customer uses the entire bottom section of the ice cream jacket for storing his packaged merchandise and keeps his 2½ gallon cans of dipping ice cream in the Trayveyors, he will want a colder temperature on the bottom of his ice cream jacket than on the top. This can be obtained by adjusting the expansion valve to supply refrigerant to the entire coil wrapped around the ice cream jacket. If a customer desires to use five gallon cans of dipping ice cream and place his packaged merchandise in the extreme end compartment, he will need uniform temperatures top to bottom on the right hand end of the ice cream jacket and a slightly colder temperature for his packaged goods on the left hand end. By referring to the wrapping of the coil again, it will be seen that if that portion of the coil on the bottom of the back wall is not supplied with refrigerant, a uniform temperature will be obtained on the right hand end of the tank and a colder temperature on the left hand end, due to the additional coil on that end. If the customer desires to use nothing but five gallon cans for dipping, then only the top section of coil which is, in reality, a stub tank, is supplied with refrigerant. This, of course, will produce uniform temperatures from top to bottom throughout the entire ice cream jacket.

Bishop and Babcock Fountain

About that time, The Bishop and Babcock Company, we believe, were the first to introduce a soda fountain making use of the then new idea of instantaneous water cooling, embodied in the Temprite Water Cooler, Shortly thereafter, however, the Bishop and Babcock people discontinued the soda fountain branch of their business; consequently, relatively few of those fountains were produced but some manufacturers took up the use of the instantaneous water cooler, but made use of the Frigidaire type rather than the Temprite. The two coolers are rather similar and embody the same principle of passing the liquid or beverage to be cooled

* Service Manager, Bastian Blessing Co., Chicago.
Paper delivered before the 6th Annual R.S.E.S. Convention.

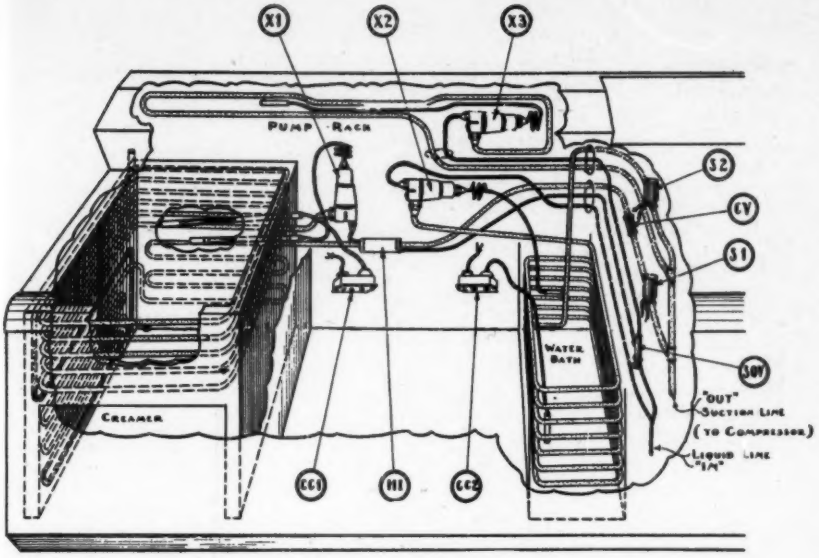


Fig. 17—Phantom view of the Russ Soda Fountain Circuit.

through a thin wall tubing that is submerged directly into the liquid refrigerant. The liquid refrigerant is maintained at a constant low temperature by a slippery valve, or two-temperature valve. These valves, of course, have a limit stop on them that will prevent the valve being adjusted beyond the point where the liquid refrigerant would be below freezing, but these valves have no differential and will lift immediately on the slightest increase in pressure of the liquid refrigerant.

The method of maintaining the level of liquid refrigerant within the cooler is the outstanding difference between the two coolers—the Frigidaire cooler maintains the liquid level by the use of the thermostatic expansion valve, whereas Temprite makes use of a float valve.

The first Russ soda fountains employing the Frigidaire instantaneous cooler were completely dry direct expansion, using coiled bare copper tubing around the ice cream lining in the same manner as described on the previous Russ fountain.

Then dry direct expansion bare copper tube coil refrigerating the storage compartment and the syrup jar rail and the Frigidaire instantaneous water cooler was placed in one corner of the storage compartment as in the illustration.

The method of control was also similar to the earlier water bath fountain in that a small cold control actuated by the temperature in the ice cream compartment operated a solenoid valve in the suction line from the ice cream compartment and the compressor was operated by a low pressure control. It was recommended that the low pressure control be set to cut in about 12 pounds and cut out about 3 inches or 4 inches of vacuum.

This high cut in point was quite naturally too high for the ice cream temperature but it was calculated that the instantaneous water cooler and the syrup rail and storage compartment coil would bring the pressure up to the cut in point at sufficiently frequent intervals so the ice cream would be refrigerated whenever the solenoid valve was open, but the solenoid valve and temperature control would provide a positive low limit control so that the ice cream could not become too stiff if the instantaneous cooler was heavily used, causing the compressor to cycle very frequently.

The system operated successfully when properly adjusted but it was too easily possible for the service man or installer to misset the low pressure control and thereby cause considerable trouble; for example, let us suppose that the service man set the low pressure control to cut out at approximately 0 lbs. rather than 5 inches. The compressor would then cycle satisfactorily and perhaps

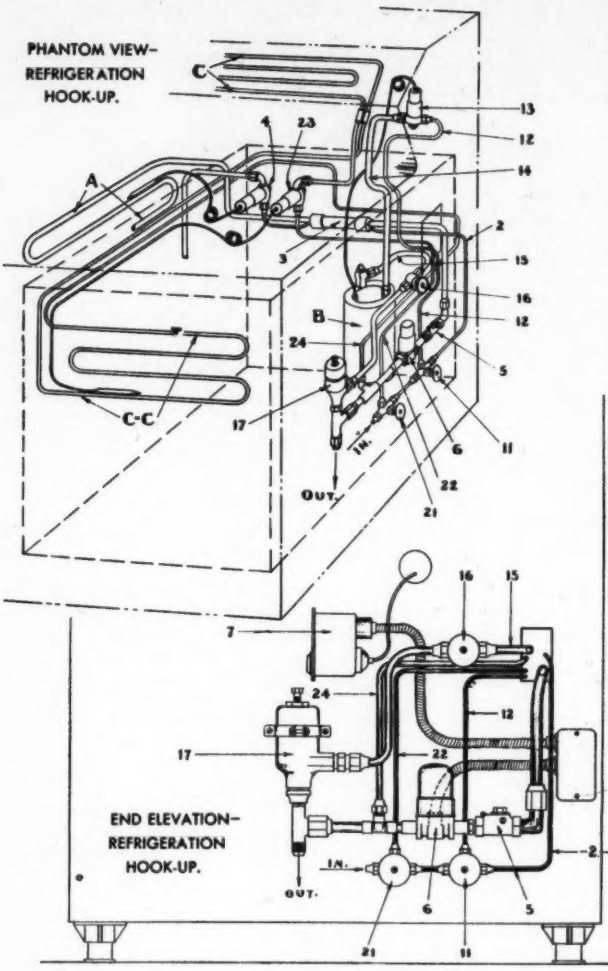


Fig. 18—Phantom view of White-Knight dry expansion fountain manufactured by Bastian Blessing.

result in a very good ice cream temperature. The small cold control, however, might be set, through error or carelessness on the part of the fountain operator to a temperature perhaps 3 or 4 degrees colder; as a result the lower temperature will never be reached since the compressor would cycle on the low pressure control and the solenoid valve would remain energized for a matter of days or weeks and would finally burn out.

It was therefore decided to use—instead of the small cold control and solenoid valve—a sufficiently heavy temperature control that could act directly on the condensing unit and to wire that control in parallel with the low pressure control on the condensing unit. With that arrangement it was recommended that the low pressure control be set to cut in about 25 pounds and to cut out at about 5 pounds. The low pressure control then acted independently of the temperature control, and started and stopped entirely on demand by the water cooler and the syrup rail and storage compartment. The ice cream temperature was controlled by the temperature control which of course would remain open for long periods of time without doing any damage, and when the ice cream did require refrigeration—the temperature control would close and cause the condensing unit to operate, and of course, would continue to run until the suction pressure was reduced to a point where the cold ice cream coil was refrigerating; this point would be approximately 0 or 1 pound pressure—when the temperature was satisfied the temperature control would open and the compressor would remain idle until further service was demanded by either the low pressure control or the temperature control.

The Bastian-Blessing soda fountain of 1936, 1937 and 1938, as well as the Russ soda fountain of those years were built to operate on that system. The fountains were very similar with the exception of the coil winding in the ice cream compartment. We have already described the unusual coil winding of

the Russ soda fountain made necessary by the use of the sliding trays, and the coil winding in the Bastian-Blessing soda fountain assumed practically the characteristics of the stub brine tank, that is, the bare copper tube coils were wound from the middle of the tank to the top providing the stub tank refrigeration effect, except at the last 10 gallon sleeves where the coil was wound completely to the bottom, providing the lower temperature needed for the brick compartment, just as it occurred in the brine tank system.

In 1939, the Stanley Knight Soda Fountain Company produced a soda fountain making use of cold plates to what we know as "conversion" plates or "eutectic" plates. These plates formed partitions dividing the can space and were used in conjunction with a

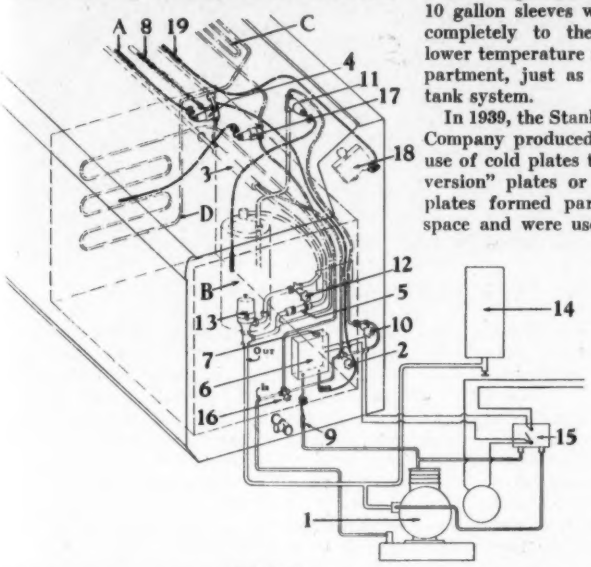
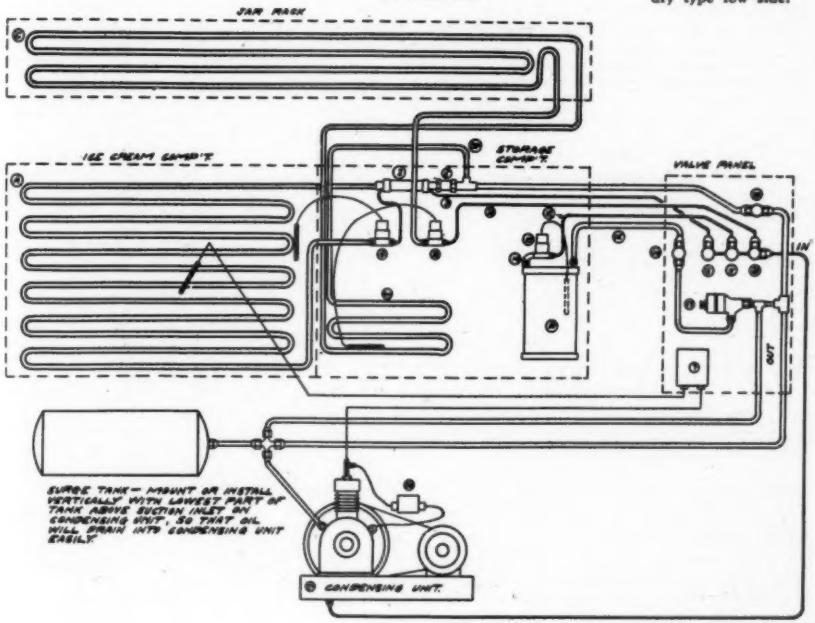


Fig. 19 — (Left) Phantom view of Russ Monarch 37 Cabinet.

Fig. 20—(Below) Bastian - Blessing fountain with all dry type low side.


JAR RACK
ICE CREAM COMP'T.
STORAGE COMP'T.
VALVE PANEL
IN
OUT
SURGE TANK — MOUNT OR INSTALL VERTICALLY WITH LOWEST PART OF TANK ABOVE SUCTION INLET ON CONDENSING UNIT, SO THAT OIL WILL DRAIN INTO CONDENSING UNIT EASILY.
CONDENSING UNIT.

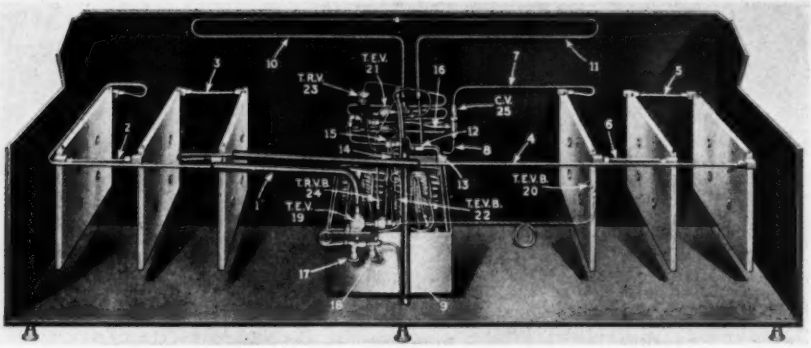


Fig. 21—Stanley Knight fountain employing cold plate or Eutectic plate low side.

water bath tank system of water cooling and a direct expansion refrigeration coil to cool the syrup rail and storage compartments, as described in Fig. 21.

The Brunswick-Balke-Collender Company produced a soda fountain having a novel direct expansion coiling arrangement making use of separate compartment sleeves for brick and bulk ice cream temperature. The method of coil winding was from the expansion valve (thermostatic to the top of the brick compartment, coiling spirally downward all the way to the bottom, then the coil moved over to the top of the bulk compartment lining and the coil, spirally downward on that lining, finally leaving after coiling down about three-quarters of the way on that lining and that coil. Three wells were provided for the thermostatic expansion valve bulb; one on the final turn, one approximately three turns back on the coil, and one four turns on the coil.

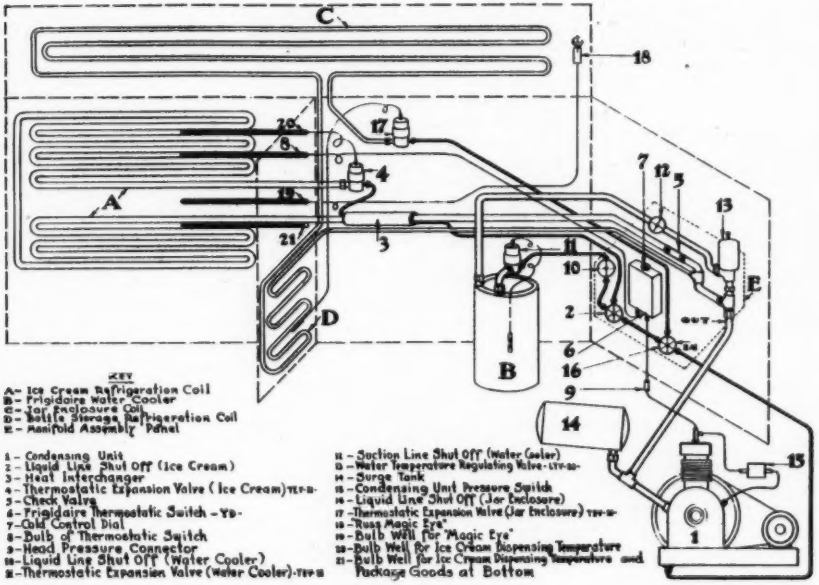

KEY
A- Ice Cream Refrigeration Coil
B- Frigidaire Water Cooler
C- Jar Enclosure Coil
D- Bottle Storage Refrigeration Coil
E- Manifold Assembly Panel
1 - Condensing Unit
2 - Liquid Line Shut Off (Ice Cream)
3 - Heat Interchanger
4 - Thermostatic Expansion Valve (Ice Cream) TEV-B-
5 - Check Valve
6 - Frigidaire Thermostatic Switch - YD-
7 - Cold Control Dial
8 - Bulb of Thermostatic Switch
9 - Head Pressure Connector
10 - Liquid Line Shut Off (Water Cooler)
11 - Thermostatic Expansion Valve (Water Cooler) TEV-B
11 - Suction Line Shut Off (Water Cooler)
12 - Water Temperature Regulating Valve - LTV-20-
14 - Surge Tank
15 - Condensing Unit Pressure Switch
16 - Liquid Line Shut Off (Jar Enclosure)
17 - Thermostatic Expansion Valve (Jar Enclosure) TEV-B-
18 - "Russ Magic Eye"
19 - Bulb Well for "Magic Eye"
20 - Bulb Well for Ice Cream Dispensing Temperature
21 - Bulb Well for Ice Cream Dispensing Temperature and Package Goods at Bottom

Fig. 22—Russ Monarch 37 Fountain.

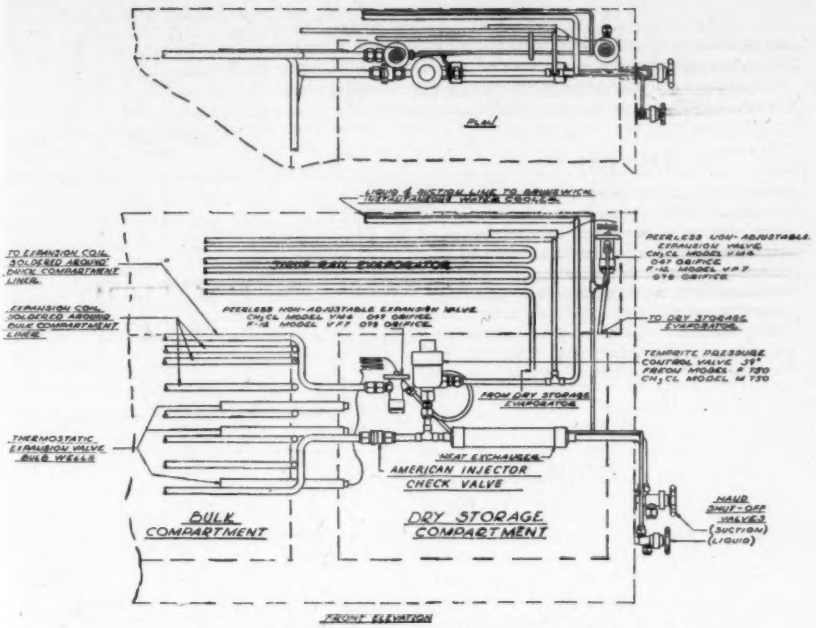


Fig. 23—A plan view and front elevation of Brunswick Creamer fountain.

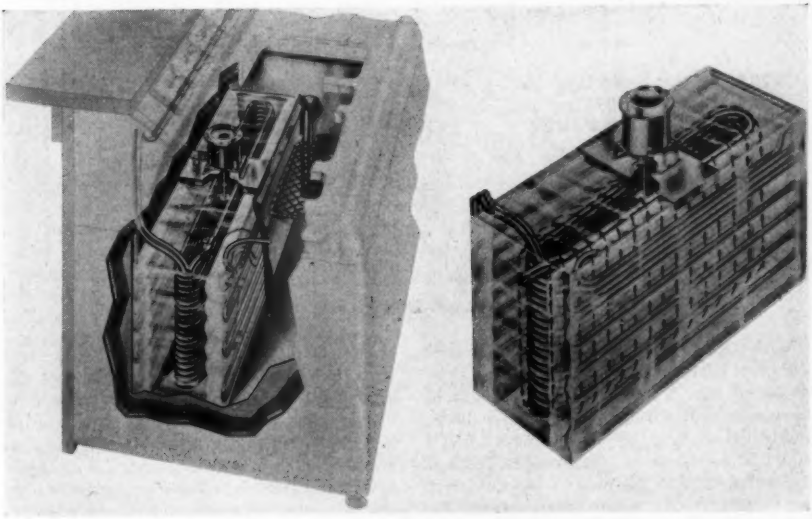


Fig. 24—Liquid Carbonic, cold stream water chilling system.

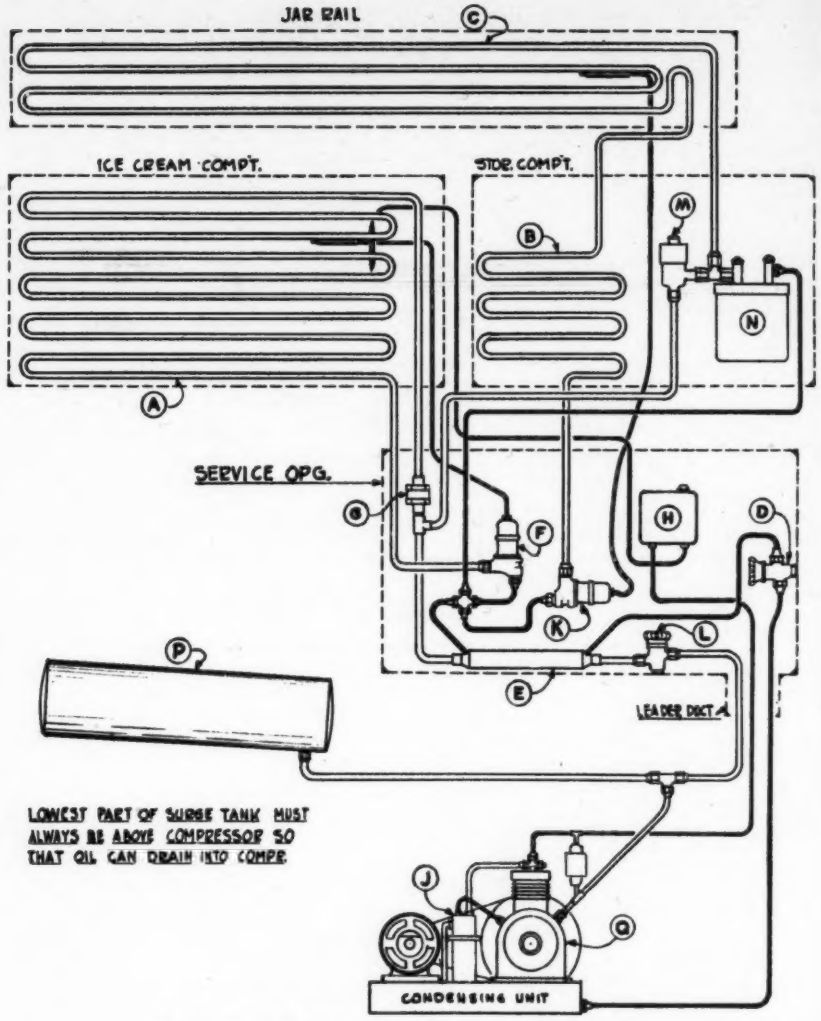


Fig. 25—The 1939 Bastian-Blessing fountain refrigerating system.

With this arrangement, the temperature difference between the two compartments can be varied over a relatively wide range; in other words, if the temperatures are to be nearly equal then the entire length of coil would be refrigerated by moving the expansion valve bulb to the well on the final coil. From this nearly equal temperature, the difference can be increased by two different stages, moving the expansion valve thermal bulb back through the two positions at the final point. Of course, the least amount of coil around the bulk ice cream compartment is being used, which makes it necessary to readjust the compressor control, causing a lower temperature in the brick compartment, and naturally, a greater temperature difference between brick and bulk.

Liquid Carbonic Fountain

The Liquid Carbonic Company, in their first line of soda fountains continue to use a stub brine tank for ice cream refrigeration, although they use the thermostatic expansion valve refrigeration and direct expansion bare copper tube coil for cooling the sweet water bath, as well as the syrup rail and storage compartment. The temperature in the sweet water bath is controlled by a temperature regulating valve and heat transfer is accelerated by the use of a circulator or agitator, thermostatically controlled, creating a rapid flow of water over the refrigerant coils and the beverage coils. The method of control is by low pressure control combined with temperature control of the ice cream temperatures.

1939 Models

In 1939 those soda fountain manufacturers using the instantaneous water cooler found it possible to maintain satisfactory syrup rail and storage compartment temperatures without the necessity of frosting the refrigeration coils for those compartments. This was accomplished by increasing the low side surface in both compartments by increasing the tubing size, and in some cases using conduction plates, and then permitting the suction line from these two coils to enter the compressor suction line between the cooler and its control valve.

As we previously explained, the control valve of these instantaneous coolers is simply a constant pressure valve, maintaining a constant pressure in the cooler, and when the additional coil circuit was teed into the control valve, of course, the valve would maintain the same pressure in the extra coil, as it did in the instantaneous cooler—a pressure slightly above the freezing point of water, or approximately 31 pounds. The syrup rail and storage compartment coils were maintained full flooded with refrigerant by means of a thermostatic expansion valve entering at the bottom and leaving at the top of the coil.

This system was very successful in maintaining a constant temperature in the syrup rail and storage compartment of about 40 to 43 degrees with a 34 degree refrigerant temperature. That system also eliminated the possibility of the instantaneous cooler freezing up, because of too low a temperature in the storage compartment, which was one of the possible complaints with the earlier systems.

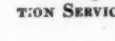
Also, on earlier systems—where the coils were maintained at a below freezing temperature, they would accumulate a coating of frost, and at intervals would have to be defrosted. Of course, it was not desirable or recommended for the user to shut off the fountain compressor; consequently it was necessary to provide separate wheel shut off valves on those circuits to permit occasional defrosting. These shut off valves were eliminated when the new system came into vogue.

This brings the history of fountain-design up to the present time. The reader now has a general idea of the evolution of the mechanically refrigerated fountain and has a fair conception of the present systems in use. Please understand that no attempt was made to cover every soda fountain manufactured, or, for that matter, every type of fountain—partly for the reason that there has been no centralized source of information, and it has been the Author's experience that very few soda fountain companies published or circulated service manuals, and as a result, real technical information on old soda fountains is difficult to obtain.

We have not attempted to treat the individual ills or the complaints—just a general and candid expression of the natural weaknesses and "growing pains" of the industry, as a whole.

For specific information in connection with soda fountain, we would suggest that you get in touch with the manufacturer directly, or through your publication THE REFRIGERATION SERVICE ENGINEERS.

Concluded



J. E. Herson
New Jersey

After reading this Publication for the past five years, I wish to state I think it is the best ever.

Ellsworth F. Cassing
Missouri

THE REFRIGERATION SERVICE ENGINEER has given me hours and hours of pleasure, making me feel that if I missed one issue I would be cheating myself . . . So, . . . SEND 'ER ON!

Virgil P. Brewer, Jr.
North Carolina

It's a great magazine and I certainly want to preserve my copies.

The Question Box

Readers are invited to send their problems pertaining to the servicing of household refrigerators and small commercial refrigerating equipment as well as oil burners to "The Question Box."

SUPER-SERVICE BOTTLE COOLER

QUESTION 371: I would like information on the Super-Service Bottle Cooler. I can find no name plate on the cooler or unit. The one I have is a combination bottle cooler and dry storage, and is powered by a ⅙-hp. motor. The dry storage compartment is cooled by a brine-filled chill plate in the back, and there is a coil around the bottle cooler compartment. The refrigerant is fed to the chill plate through an automatic expansion valve, then is circulated up to the coil surrounding the wet storage, then back through the suction line.

I believe that methyl chloride is the refrigerant. I am not sure, as there is no gas in the unit, but from the oil, I get a reaction with a Halide torch.

The unit does not cool the water down, neither does it give correct cooling in the dry storage compartment. My opinion is that the unit is too small for the box. I intend to put a ¼-hp. unit in and increase the coil capacity in the dry storage with a chill plate in each end of the compartment, and use a thermostatic expansion valve on it. Then, in the bottle storage, I will enlarge the coil by placing more coil in the bottom of the compartment, where it will be in direct contact with the water, and control that coil with a thermostatic expansion valve. I will use methyl chloride as the refrigerant. I am wondering if I will have to use a check valve in the suction line of the wet storage coil. I want to carry the water temperature at 35 degrees, and the dry storage compartment at 40. I could maintain a 35-degree temperature without doing any harm.

Would it be possible to place the chill plate in the top of the dry storage, leaving a two-inch air space, a three-inch space at the back, and three inches on each end, and then using a fan for air circulation?

ANSWER: It seems rather peculiar that neither the cooler nor the refrigerating unit would have a name plate from which you could get some data concerning it.

The fact that you were able to get a reaction with a Halide torch from the oil of the compressor would indicate that the system was charged with either methyl chloride or Freon. These are the two most commonly used gases in this type of work.

The article on Page 30 of the October 1939 issue of THE REFRIGERATION SERVICE ENGINEER describes one method of determining which the machine might be charged with under the particular circumstances with which you are confronted.

I don't believe that a check valve would be of any value in the wet storage section of this cooler since your coldest evaporator will probably be in the dry storage section and if the check valve is used anywhere the cold storage section would be the most logical point, since the gases would have a tendency to evaporate in that section.

I don't believe, however, that it is necessary to use a check valve at all, but it may be necessary to install a constant pressure valve or a two-temperature snap action valve in the wet storage section to guard against the possibility of the temperatures becoming too low and freezing the bottled goods. If there is room to install a chill plate in the top of the dry storage section as you have described, I believe that such an arrangement would be an improvement over the present arrangement.

A fan circulating the air over this section should increase the efficiency of the low side considerably.

KELVINATOR REFRIGERATORS

QUESTION 372: Regarding Kelvinator open-type reciprocating compressor units. I believe the model I have in mind was put on the market late in 1937 or 1938.

A question of this type was answered in one of your REFRIGERATION SERVICE ENGINEER magazines, and your answer to this question was that the gas, upon leaving the compressor, entered a container, or oil trap, then continued through the condenser, through a second container, or high side float, and then to the evaporator.

When it is necessary or desired to move a condensing unit into a basement do you believe it is necessary to install a larger suction return to the compressor if the suction line and feed line on the machine are ¼ inch tubing? The unit is being moved away from the evaporator a total distance of 20 feet.

On domestic power elements about how much pressure is usually applied to the bellows and operating contact? Is there any way of measuring this pressure if control fails to operate? When it becomes necessary to replace a power element some of these elements have a bulb about 3/16 inch in diameter, held alongside of the evaporator, and seated in a slotted rubber channel. The new type of bulb is approximately ⅜ inch in diameter, so this rubber becomes useless. Do you believe that by clamping this bulb to the side of the evaporator, without surrounding it with rubber, satisfactory results could be achieved?

I replaced one type of control by removing the rubber and installing the larger bulb under the present clamp, although a good portion of the bulb remained unexposed to the contact of the evaporator surface. I feel that these bulbs should have an additional metal surrounding them, to have more influence on the power element. This machine would short cycle, then run too long, then stop, and run for 10 seconds. By pushing on starting switch when machine was idle, it would start. Nothing was done to it, but now it has operated fine for a month. The first new control of this type acted the same way, and I thought the control was a fault, but it did not seem to be.

Should Feed Line Be Covered?

When a high side float job is located about 20 feet from the evaporator, would you advise covering the feed line beyond the high side float with rubber tubing as an insulator?

ANSWER: I am wondering if you have not overlooked the high side float in the Kelvinator machine you have in question.

These floats are usually located near the top of the box close to the evaporator and it is quite possible that it would be overlooked unless you know where to locate it. If, by chance, there is no high side float on this machine, then it must have been replaced with a capillary tube or expansion valve or possibly the entire evaporator was changed to include a low side float.

The container located between the compressor and the condenser as stated in a previous question is an oil trap, which is designed primarily to take care of any oil slugging which may occur.

If the condensing unit is to be installed in a remote location of 15 feet or more from the refrigerator it would be advisable to increase the suction line to ⅜-inch copper tubing. This can be done by cutting off the ¼-inch line about a foot or two from the evaporator and connecting the ⅜-inch line from there to the machine.

The amount of pressure applied to the bellows of a cold control will be in direct relation to the temperature surrounding it. In other words, these controls are charged with one of the refrigerants commonly used and the pressure, therefore, varies with the temperature. A common method of determining when the bellows is discharged is to endeavor to compress the bellows between the thumb and forefinger. If it is easily compressed you may be sure it is partially discharged.

The contact between the clamp and the thermostat bulb or the fact that the rubber guard does not completely cover it should not have any bearing on the operation of the thermostat. These guards are intended primarily as a protection against damage and as a means of keeping ice formation from the outer part of the bulb. The bulb gets its action from the contact between it and the evaporator only, and the clamp is merely a means of holding it firmly against the evaporator.

The fact that the machine has a tendency to short cycle for the first period of operation would be more likely due to some condition in the evaporator such as being oil logged or possibly to the control being too stiff in operation.

Where the high side float is located some distance from the evaporator it is always necessary to insulate the liquid line or to reduce the size of the liquid line to about ⅛-inch tubing so that no expansion occurs until the liquid reaches the evaporator.

KNIGHT SODA FOUNTAIN

QUESTION 373: I have been asked to correct the faulty performance of a Knight Soda Fountain, about a 1935 model. The two holes to the right and farthest from the coil do not reach a temperature lower than 30 degrees F., though the hole to the left of the coil is —10 degrees F.

Evidently, the trouble is faulty brine circulation. There are four holes with the low-

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side float and coil between the first and second hole. How is the best way to clean out the brine tank?

ANSWER: I believe you will find the trouble with the Knight soda fountain is that the calcium brine has become weak and it is probable that you will find the evaporator has a coating of ice around it which is acting as an insulating blanket.

As you probably know, when the specific gravity of the brine changes with age, so the circulating conditions within the cabinet will change.

I believe if you will add more calcium chloride to this brine or, preferably, discard the old brine and mix a new solution, you will overcome your trouble. About the only method available for removing the old brine and cleaning out the tank is by using a syphon pump until as much of the old brine is removed as possible and then washing with an ordinary garden hose.

DRYING OVEN NEEDED

QUESTION 374: I have been having trouble lately with a G.E. monitor top DR-2. The motor is ⅛ split-phase, with an external relay, capacitor and auto transformer.

The original trouble was a leak which occurred as a result of suction line corrosion, where it left the evaporator. The machine was taken apart completely, and all bad connections replaced and resoldered. I cut the condenser where it left the top of the dome, and inserted a three-way valve. Then I replaced the existing float with one made by Imperial, as this make has a special screw for purging and by-passing the float prior to charging.

After purging air a few times, the pressures became normal, and everything seemed to be working very well; then there occurred a partial burn-out of the motor, as a result of a short between phases.

Now, I have had the machine apart three times, rewinding the stator twice. The last time, I rewound it concentrically so as to be able to put in more phase insulation. Originally, it had a distributed winding. After assembly, the machine ran for a whole week with pressures and temperatures fine, and then kicked off. It is getting to be monotonous, but I don't give up so easily.

Now I know that moisture is causing the trouble, having also found carbon deposits each time I strip the machine. But what can I do? We are not equipped with a baking oven of this size, and I am doing everything I know how, to exclude moisture, such as baking parts separately, and then heating all over with a torch during evacuation. Of course, the air in the dome is a problem, but I try to purge most of this out with SO_2.

My question is: Do you think changing over to Isobutane will help? It can be done with other units, why not with a hermetic? In this case, even if there were a little moisture, it would be non-acid and not likely to damage a shellacked winding. Also, there would be no danger of stick-up.

ANSWER: I can quite understand the trouble you are having in endeavoring to rebuild the DR2 unit without the facilities of a bake oven. The thorough drying and baking out of these units is probably one of the most important steps in their rebuilding and I doubt if it will ever be possible to obtain much success without this process.

I would not be in favor of attempting to replace the refrigerant with Isobutane. There are several reasons for this. In the first place, Isobutane would decrease the refrigerating ability of the machine and cause it to run considerably longer than it does with SO_2.

In the second place, these units are so closely fitted and with such close tolerances in the working parts that a change in gas may create mechanical disturbances in the unit, due to the fact that heavier oil would have to be used.

Third, I don't believe Isobutane should be used in any hermetically sealed unit where the motor or any electrical device is enclosed in the area to which the refrigerant has access. Isobutane, as you know, is highly flammable, even to the point of being explosive and if such a thing as a short between two sections of the motor winding should occur, causing a spark, there is the possibility of an explosion within the unit.

I can't see any remedy for your trouble other than arranging some sort of a bake oven with which to properly dry this unit. This should not be so hard, since it is only necessary to secure any kind of a metal container large enough to hold the unit, then place a hot plate or any kind of a gas burner in it so a temperature of about 200 degrees may be maintained on the unit for a period of about 10 hours while drawing a vacuum of 28 or 29 inches on all parts of the unit. I would imagine that if you went to some junk yard nearby you would probably find an old metal container which would meet your purpose and which could be easily covered with asbestos.

R.E.M.A. Spring Meeting

Two-Day Conference Held on May 23-24 at Edgewater Beach Hotel, Chicago
E. A. Vallee Elected New President. 138 Exhibit Spaces Reserved in First Drawing

THE fifth annual meeting of the Refrigeration Equipment Manufacturers Association in Chicago, May 23-24 at the Edgewater Beach Hotel, provided a busy two-day session for the members of the association. Member firms represented exceeded any previous spring meeting.

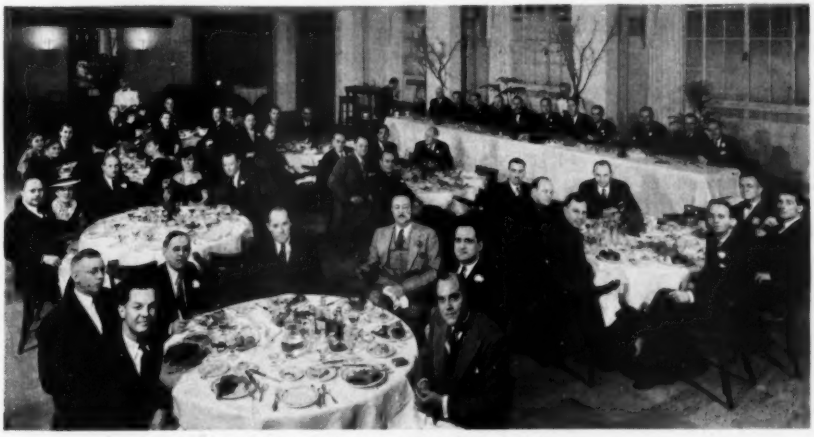
Concluding the business of the two-day session, the Board of Directors elected Earl A. Vallee, Automatic Products Company, Milwaukee, Wisconsin, President; William C. Allen, Modern Equipment Company, Defiance, Ohio, Vice-President; R. H. Luscombe, Penn Electric Switch Company, Goshen, Indiana, Secretary-Treasurer. R. M. McClure was again appointed Executive Secretary. The new members of the Board of Directors are E. J. Tweed, Dole Refrigerating Company, Chicago; A. B. Schellenberg, Alco Valve Company, St. Louis, Missouri, and M. W. Knight, Peerless of America, Inc., Chicago. Carry-over members of the Board include: J. D. Colyer, Wolverine Tube Co., Detroit; David H. Daskal, Perfection Refrigeration Parts Co., Harvey, Ill.; Edward Gammie, Victor Mfg. & Gasket Co., Chicago; E. W. McGovern, R. & H. Chemicals, Wilmington, Del.

President J. S. Forbes of Superior Valve & Fittings Co., Pittsburgh, presided at the meetings during the two-day session, which included reports of various committees, such as the joint meeting of the Manufacturers-Jobbers Relations Committee and the R.S.E.S.-R.E.M.A. Relations Committees, and others.

On Thursday evening, the Association held a banquet and entertainment at which time President Forbes was the recipient of an oil painting, the gift of the Association for his work as President. Previously, H. V. Higley, Ansul Chemical Company, Marinette, Wisconsin, declined the suggestion that he accept the presidency for the succeeding year, and in appreciation of the work that he had contributed to the Association, he was presented with a golf bag.

The R.S.E.S. Contact Committee met with the Manufacturers Committee to discuss plans for the holding of the Seventh Annual R.S.E.S. Covention in conjunction with the Third All-Industry Refrigeration and Air Conditioning Exhibit.

The last business of the second day's session was a report of the Exhibition Committee with Chairman M. W. Knight making the report, and the drawing for spaces in the 1941 All-Industry Refrigeration and Air Con-



THE R.E.M.A. BANQUET WAS HELD MAY 23.

E. A. VALLEE
President

W. C. ALLEN
Vice President

R. H. LUSCOMBE
Secretary-Treasurer

ditioning Exhibit. Considerably more space has been provided this year in order to accommodate the increased number of firms planning to exhibit. Members were allotted the first choice of spaces with non-members the second choice, and the result of the drawing showed that 138 spaces had been reserved.

LIST OF EXHIBITORS AS OF JUNE 1, 1940

Acme Industries
Air Maze Corporation
All-Steel-Equip Co., Inc.
Alco Valve Company, Inc.
Aluminum Company of America
Aluminum Industries, Inc.
American Brass Company
American Hard Rubber Co.
American Injector Co.
Ansul Chemical Company
Automatic Products Co.
Black-Sivalls & Bryson, Inc.
Bonney Forge & Tool Works
The Bush Manufacturing Co.
Business News Publishing Co.
Brunner Manufacturing Co.
Carrier Corporation
Chase Brass & Copper Co.
Chicago-Wilcox Mfg. Co.
Commercial Coil & Ref. Co.
Convention Binder Service
Copeland Refrigeration Corp.
Curtis Refrigerating Machine
Cutler-Hammer, Inc.
Day & Night Water Heater Co.
The Dayton Rubber Mfg. Co.
Deissler Machine Co.
Detroit Lubricator Co.
Dole Refrigerating Co.
E. I. duPont de Nemours & Co.
The Electrimatic Corp.
Fairbanks, Morse & Co.
Fedders Mfg. Co.
General Construction Corp.
General Electric (Motor Div.)
General Electric (AC & CR Div.)
Gale Products
L. H. Gilmer Co.
W. A. Hammond Drierite
Heating & Ventilating
Henry Valve Company
Iceberg Refrigerated Locker
Ideal Beer Cooler Co.
Imperial Brass Mfg. Co.
Jarrow Products
Kason Hardware Corp.
Kold-Hold Mfg. Co.
Kelvinator Division
Kerotest Mfg. Company
Marlo Coil Company
Master Refrigerated Locker
Jas. P. Marsh
McCord Radiator & Mfg.
McIntire Connector Co.
Mills Novelty Company
Minneapolis-Honeywell
Modern Equipment Corp.
Mueller Brass Company
Nickerson and Collins
Peerless of America
Penn Electric Switch Co.
Portable Elevator Mfg.
Perfection Ref. Parts
Ranco Inc.
Refrigeration Appliances
Rotary Seal Company
Servel, Inc.
Spoehrer-Lange Co.
Square D Company
Superior Valve & Fittings
Tecumseh Products Co.
Temprite Products Corp.
Tuthill Pump Company
Tyler Fixture Corp.
Universal Cooler Corp.
Utilities Engineering Inst.
Victor Mfg. & Gasket Co.
Virginia Smelting Co.
The Weatherhead Co.
White-Rodgers Elec. Co.
Williams Oil-O-Matic
Wolverine Tube Company
York Ice Machinery Corp.
Wagner Electric Co.

R.S.E.S. Convention in Chicago

JANUARY 13-16, 1941

THE Board of Directors acting upon the report of the R.S.E.S.-R.E.M.A. Relations Committee, have announced the 7th Annual Convention of the society will be held in Chicago, January 13-16, 1941, the dates of the All Industry Refrigeration and Air Conditioning Exhibition.

Lower Installation Cost
with the 9160 CAPACITY BOOSTER VALVE

Above • 9160 Capacity Booster Valve installation made by Farr Refrigeration Service on Westinghouse Air Conditioning system in Allen Shoe Store, Cleveland.

As a thermostatic expansion valve of high capacity, the 9160 Capacity Booster Valve offers economy in first cost and improved performance. Advantages—smooth modulation, tight shut-off, and surge control.

Wherever there is a use for high capacity automatic valves of any type, there is a place where the 9160 can be used to advantage. Any type of Booster Valve action can be obtained by the proper selection of the pilot valve or valves. Use the Capacity Booster Valve for your high capacity job. Write for details.

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Jobber Inquiries Invited

NIAGARA FRONTIER CHAPTER ANNUAL BANQUET

THE Niagara Frontier Chapter held its annual banquet May 11 at the Hotel Touraine in Buffalo, where more than two hundred members and their wives and friends from many miles around Buffalo attended. There were delegations from Ontario Maple Leaf Chapter, Mohawk Valley Chapter, Mount Royal Chapter, Ontario Forest City Chapter, Central New York Chapter, and the Binghamton Chapter.

The program was opened with the singing of the Star Spangled Banner, and because of the many Canadian members present, God Save the King.

After everyone's appetite was thoroughly satisfied, the meeting was opened by John Bush who acted as Master of Ceremonies. He handed it over to Mr. George O'Hara, retiring president, and Mr. O'Hara proceeded with the installation of the newly elected officers, who were as follows: *President,* John Muller; *Vice president,* Mr. Bush; *Secretary-Treasurer,* Stanley Szyszkowski; and *Sergeant-at-Arms,* William Goeckel. The Board of Directors are Fred Cameron, Ralph Davis, Jr. and George O'Hara, Jr.

Mr. Bush then introduced Mr. S. W. Strouse, Director of the Buffalo Air Conditioning Council, who presented a very informative talk on the advancement of air conditioning in this area. He declared that the theater was the first big market for air conditioning, and said that the demand has spread to restaurants, taverns and other places catering to the public, where the public comfort must be considered.

Mr. R. G. Burns, National President of the Society, was next introduced, as were other members of the Canadian delegation present for the evening. Mr. Burns, who is Sales Manager of Kelvinator of Canada, Toronto Branch, declared that business has been steadying down lately in Canada following a period of uncertainty due to the outbreak of the war. The result has been an acceleration in buying. He expressed himself as feeling that the placing of government orders should keep the plants at a busy pace right through the year, and as for air conditioning, "this industry has not as yet reached the proportions attained in the United States, but there is considerable activity in some of the larger stores." Mr.

Al gets the last drop!

It's his character as a drinker that makes *Activated Al* such a good helper.

Al's drinking ways are the ways of the Activated Alumina from which he is formed. And it is a well-known certainty that Activated Alumina gets and holds the last bit of moisture which can cause clogging of refrigerator valves. That's one reason for its dependability as a drying agent for dehydrators. It also removes acid, thereby preventing dilution and decomposition of the refrigerant, sludge formation in the lubricant, and corrosion of parts. That makes it a *very superior* drying agent.

Because Activated Alumina is so thorough, so dependable, and removes acid, it's worth making sure you get it. Remember to say "Activated Alumina" when you buy dehydrators and replacement supplies. ALUMINUM ORE COMPANY. (*Sales Agent:* ALUMINUM COMPANY OF AMERICA, 2159 Gulf Building, Pittsburgh, Pennsylvania.)

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★ ALORCO ★

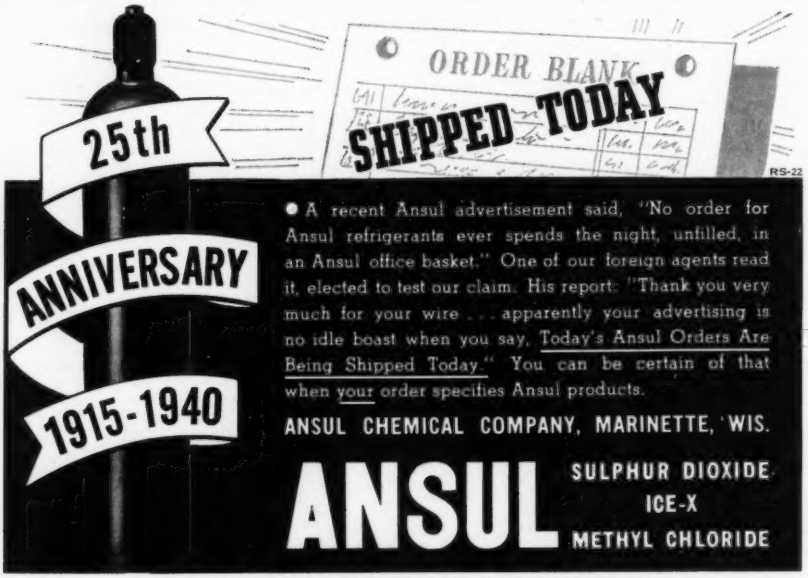
ACTIVATED ALUMINA

DRIES REFRIGERANTS DRY

GENERAL VIEW OF THE NIAGARA FRONTIER CHAPTER ANNUAL BANQUET.

Burns completed his talk with information on the "Why" of the Refrigeration Service Engineers Society.

Following the talks, a motion picture taken by Mr. Herman Goldberg at the 1940 National Convention in Chicago was shown. Group singing and dancing completed the evening's entertainment.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● A recent Ansul advertisement said, "No order for Ansul refrigerants ever spends the night, unfilled, in an Ansul office basket." One of our foreign agents read it, elected to test our claim. His report: "Thank you very much for your wire . . . apparently your advertising is no idle boast when you say, Today's Ansul Orders Are Being Shipped Today." You can be certain of that when your order specifies Ansul products.
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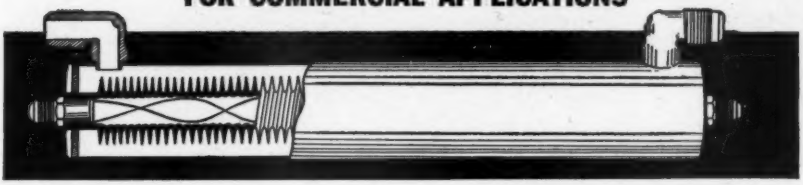

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Tube Diameter 1⅝"

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1-⅞" Sweat
Liquid Connection Size ⅜"
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Tube Diameter 2⅛"

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You get these Outstanding Advantages!

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- Elimination of Drier Coil
- Increased Capacity through Interchange of Cold Gas and Warm Liquid
- Compact and Easy to Install
- Fitted with either "Flare" or "Sweat" Connections
- Conducive to High Heat Transfer because of Integral "Fin" Tubing (Tubing all in 1 piece)

ACTIVITY OF LONE STAR CHAPTER

LONE STAR Chapter is planning an observance of formal presentation of its charter, to take place early in June, and hopes thereby to materially increase the membership roll of the group in Dallas.

Committees have been named to arrange for a banquet to be held on the evening of the presentation, and for a suitable program complementing this affair.

Recent meetings of the chapter have proved extremely interesting. At the first session in May there was open forum discussion of problems.

At the second meeting there was a proposal made with unanimous approval that a question box be provided, in which members may deposit questions to which they sought answer, and thus provide a fertile source for helpful discussions.

There also was a lengthy discussion by R. E. Thorp, of Wolverine Tube Co., on the subject of use of copper tubes and fittings in refrigeration.

Mr. Thorp furnished comprehensive discussion of the subject, treating upon such matters as the methods of fabrication of copper tube, its relative tensile strengths, and the many and varied fallacies concerning such equipment extant in the ranks of engineers.

Chapter Notes

Under this heading will appear news of the chapter meetings. For names of the officers and dates of regular meeting nights, please refer to the Chapter Directory.

KANSAS CITY CHAPTER

April 9—The subject of the various charges being made by service shops on capacitor and repulsion induction motors was broached. Since the cost of repairs on capacitor motors is higher, it was his suggestion that the charges should also be higher. The meeting was turned over to F. A. Thompson, who introduced Perry Aiken, who gave an interesting talk on Crosley products as a part of his program. He demonstrated a machine and gave an explanation on the transcribing of pictures from a record.

April 23—A guest of the evening was Mr. Roepke of Alco Valve Company. R. W.

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of illustrated, technical data on Modern Dehydration with Thawzone. Write us for your copy, mentioning jobber's name.

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The PIONEER FLUID DEHYDRANT

Peerless VALVES
TAKE THE JITTERS OUT
OF THERMAL IMPULSES

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So insist on Peerless Valves—for maximum coil efficiency.

PEERLESS "BULLETS OF BALANCE"

By merely inserting a Peerless Orifice Cartridge of the proper size, you can easily change the capacity of a Peerless Expansion Valve—establishing a hair-line balance between refrigerant flow and actual needs of the coil. Ten sizes permit quick adjustment to any refrigerating load.

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34 TYPES
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Prices, Specification Sheet and Name of Nearest Miller Jobber Supplied on Request
MILLER RUBBER CO., INC. AKRON OHIO
"Engineers in Rubber"

Young, who was detained at the American Waterworks Convention, arrived rather late, but, nevertheless, presented a very nice talk on Mueller valves and fittings, following which he spoke at some length on refrigeration codes designed in the interest of public safety. Mr. Roepke also added a few remarks to the discussion on the code.

A prize offered by R. W. Young was won in the drawing by B. E. Allen.

April 30—Mr. Graves of the Temprite Products Corporation was the speaker of the evening, and gave an interesting demonstration and talk on the Temprite Instantaneous Cooler and its applications, and of course, during the demonstration of the unit, beer was cooled and served to those present.

May 1st—On the educational program, R. H. Luscombe of the Penn Electric Switch Company, presented interesting information on the various types of switches and controls manufactured by his company. Refreshments were served following the meeting.

TWIN CITIES CHAPTER

May 1st—It was announced that the June 18 meeting would feature the showing of Herman Goldberg's film on views of the National Convention, and after some discussion, it was unanimously felt that the showing should be combined with a dinner meeting. One of the members had received instructions from the State Board of Electricity to refrain from connecting or disconnecting electric motors on domestic refrigerators until he had secured an electrician's license.

ATLANTA CHAPTER

May 20—The educational program for the evening consisted of a quiz contest in which E. V. Dunbar, W. M. Rapp, Pete Grove and Thomas Carnell acted as judges. A service man's thermometer and a pocket thermometer were offered as prizes through the generosity of the Frigidaire Corporation. The first prize was won by Joe Stephens and the second prize by George Weldon.

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No one—not even Marsh—has ever been able to build a gauge that can't be knocked, kicked or banged out of adjustment. In this connection, however, there are two important differences between the Marsh Gauge and the ordinary kind:

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GAUGES—THERMOMETERS—RECORDERS—MERCURY SWITCHES

MONTGOMERY CHAPTER

May 2—The meeting took the form of a social meeting in which beer and sandwiches were served. A large percentage of the membership were present, together with a number of visitors making the meeting the best in several months. In fact, the general idea of this type of meeting went over so well that it was decided to hold one of a similar nature approximately every ten days.

May 16—A representative of the Alco Valve Company was present for this meeting. However, due to various conditions, the meeting was rather small, and it was given over primarily to a social gathering.

FURNITURE CITY CHAPTER

May 9—After some discussion, it was decided that the meetings would be reduced to one a month during the months of July, August and September, this meeting to be held on the second Thursday of each of the three months. Further discussions brought out the suggestion that a dinner meeting be arranged for the near future to which the ladies could be invited.

The educational program of the evening consisted of the showing of moving pictures provided by Virginia Smelting Company, on refrigerants in general.

PITTSBURGH CHAPTER

April 12—The Code Committee reported progress since the last meeting, and explained that this code is primarily a safety code including the licensing of service men at a fee of $50 for the first year, and $2 renewal for each successive year. Considerable time was devoted to the discussion of this code so that everyone should have a thorough understanding of it.

A door prize donated by Williams and Company was won by K. W. Krummell, following which the meeting was adjourned to the Norse Room where a program sponsored by the Detroit Lubricator Company was being put on.

May 10—N. D. Wagener announced that the next meeting would be under the auspices of the Minneapolis-Honeywell Com-

pany. Mr. Eich of the local Kelvinator branch was introduced and invited the members to a meeting to be held May 24, at which time the Pittsburgh members will be acquainted with the Kelvinator line of equipment.

W. J. Gilbert, guest speaker for the evening, explained and demonstrated the new Syntron Swing Coupling and Syntron Seals. The presentation proved very interesting to those present, and S. C. Perry thanked Mr. Gilbert for his cooperation.

ONTARIO MAPLE LEAF CHAPTER

April 12—The President, K. Wood, gave a report on the results of the Canadian Convention, pointing out that the convention was a success from every angle, and had received wide acclaim. Letters of appreciation had been sent to all exhibitors and speakers, and acknowledgments had been received from several of the exhibitors.

Ed Spall, Treasurer, gave a report on the Convention expenses, which was well received by the members.

Ken Wood announced the formation of an Inter-Provincial Chapter, to be known as the Canadian Association of the R.S.E.S. A list of the officers was read, and those present were introduced to the assembly.

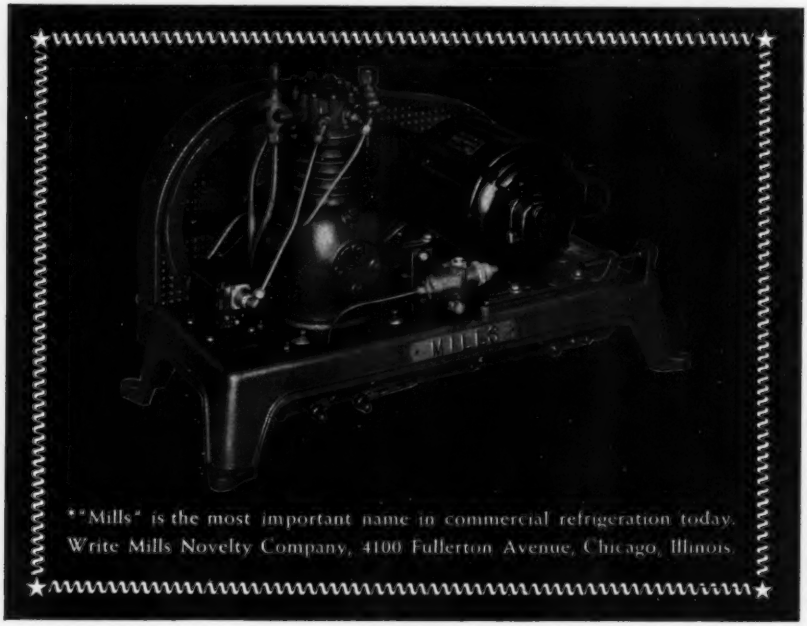
Hal Lovell, guest speaker for the evening, gave an interesting talk on Snap-On tools, accompanied by moving pictures showing the manufacture of these tools.

April 26—After the business session was completed, the meeting was turned over to the Educational Chairman, who introduced the speaker of the evening, Mr. C. Davis, of Davis Automatic Controls. Mr. Davis presented some interesting information on solenoid valves and their application, accompanying his talk with illustrations. Art Doan thanked Mr. Davis on behalf of the chapter for the splendid presentation, and the assembly showed its appreciation with hearty applause.

The balance of the evening was devoted to discussions and plans on a forthcoming picnic, being arranged for sometime in June.

May 17—Bert Nye reported that flowers had been sent to Mrs. George Aitken during her recent illness, and George Aitken had asked Bert Nye to express his appreciation.

A brief disussion was held regarding a golf tournament planned for the first part of June, also a boat trip and picnic planned for the latter part of June. Further information, it was stated, on these events would


"Mills" is the most important name in commercial refrigeration today.
Write Mills Novelty Company, 4100 Fullerton Avenue, Chicago, Illinois.

be sent out by the Secretary. The meeting was then turned over to Bert Nye of the Entertainment Committee, who had arranged a very splendid stag program of entertainment and refreshments for the balance of the evening.

CENTRAL INDIANA CHAPTER

May 19—The evening was devoted to a showing of the motion pictures taken by Herman Goldberg during the 1940 Convention in Chicago. A good turnout was in attendance, together with the wives and families of the members. It was announced that the next meeting would contain a first aid demonstration by the Red Cross.

MILE HIGH CHAPTER

April 10—After the completion of the chapter's business, a talk on refrigeration was presented by E. T. Benson of the Frigidaire Corporation, followed by two motion pictures; both the talk and pictures were enjoyed by everyone present. Victor McNatt and E. T. Benson were the hard workers responsible for this unusually enjoyable evening, and the appreciation of the chapter was extended to them. The meeting was adjourned at 11 o'clock and refreshments were served downstairs.

May 8—After some discussion, it was decided that the chapter would end its fiscal year in accordance with the National Society and hold its election of officers at the same time. It was also felt that a dinner meeting should be held previous to the election. An Auditing Committee was appointed at this time to audit the books of the Secretary, and further arrangements were completed in preparation for the annual election.

An interesting talk on Credits and Business was presented by A. R. Wilson, Secretary-Treasurer of the Auto Equipment Company. This talk proved exceedingly helpful to those who were having difficulty with the business and management end of their individual businesses.

CANADIAN CAPITAL CHAPTER

May 6—It was thought advisable that the chapter accumulate a library of refrigeration books, and the Secretary was instructed to communicate with various publishers and secure, if possible, a quantity of books which could be inspected by the membership and returned or purchased at will. It was suggested that a carton of 100 cigarettes be sent to Frank Turner, who is confined to the Civic Hospital suffering from sulphur

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dioxide burns of the eye. O. L. Meloche was designated to deliver the cigarettes.

The door prize, consisting of a set of screw drivers and donated by Mr. Hill, was won by O. L. Meloche.

CHICAGO CHAPTER

May 14—The first order of business was the matter of changing Article V, Sec. 3 of the By-Laws to read as follows: "All members of the chapter are entitled to equal and all rights of the Society, with the exception that junior members cannot hold office, nor shall be permitted to vote." The change, after the usual vote, was approved. The summer adjournment was set to begin following the meeting of May 28, and a golf tournament was suggested as the only activity to be held during the summer months. Fred Olds and Arnold Schroeder were appointed on a committee to arrange for the tournament.

The educational program consisted of the sound film entitled, "Flagships of the Air," presented by the American Air Lines, Inc. Following this, there was a discussion on Item 2 of the outline entitled, "I Want to Operate My Own Business." Both of these features proved interesting to the members.

TRI-STATE CHAPTER

April 8—After the business of the evening was dispensed with, the meeting was turned over to Mr. Coggin and Mr. Carter of the Detroit Lubricator Company, who presented a sound slide film on the Duro-Fram Expansion Valve, and a thorough explanation of the construction and operation of the valve and other products.

April 28—The meeting was devoted to a smelt fry, to which the wives and families of the members were invited. The smelt were supplied through the courtesy of the Ansul Chemical Company. As an entertaining feature of the evening, Herman Goldberg's film on views of the National Convention was shown. The Secretary was instructed to write the Ansul Chemical Company expressing the appreciation of the chapter for making this smelt fry possible.

SCRANTON CHAPTER

April 2—The evening was devoted to a tube bending contest, conducted by Mr. Burns and Mr. Burke of Imperial Brass Company. The contest, of course, was of a very serious nature, but a lighter vein was introduced through the comedy furnished

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GAS-TIGHT JOBS with speed and safety . . . You can turn soft, brass flare nuts to non-leaking tightness quickly and surely, and without damaging the nuts—by using these special Snap-on Flare Nut Wrenches. Double-broached jaws insure positive grip and ample leverage, even with limited handle movement. Thin-walled

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heads give you more working room in close quarters. Snap-on flare nut wrenches provide lifetime service. Two models cover practically all refrigeration requirements, with two sizes per handle . . . ¾" and 1", ⅞" and 1⅛". Genuine Snap-ons are available only through special factory representatives . . . write for full information.

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by one or two of the contestants and non-contestants. A local photographer from the local newspaper took a number of pictures of the event, and the winners were as follows: First, Ed Koch, Second, Fred Gethman, and Third, Karl Muller.

HUDSON MOHAWK CHAPTER

April 10—This was the night of the annual banquet of the chapter, held at "The Tavern," in honor of the charter presentation. Following the banquet, the meeting was opened by President George Gardner, and preliminary business of the evening was dispensed with. The meeting was then turned over to S. B. Garland, who presented the charter to President Gardner, and gave an interesting talk on the activities of the Massachusetts Chapters. As an entertainment feature for the evening, the movie produced by Herman Goldberg on views of the Chicago Convention was shown and enjoyed by all.

MADISON CHAPTER

April 9—Suggestions on ways and means of improving the chapter meetings brought forth the possibility of securing information on servicing and installing new products which manufacturers produce from time to time. It was thought that one member should be designated to give a talk on each of these products. The educational program of the evening included an interesting talk by Knute Spilde on servicing Norge refrigerators.

April 23—Mr. Banks of the Minneapolis-Honeywell Company was the guest speaker of the evening and gave an interesting talk on the new Series 40 Polartrons, explaining the simplicity and flexibility of these controls and the manner of installation and adjustment.

Beer was served following the meeting.

ST. LOUIS CHAPTER

April 11—The greater part of the evening was devoted to an exchange and discussion by E. Gygax on the pending code governing the installation of refrigeration in St. Louis. Mr. Gygax covered the subject at considerable length and suggested that everyone possible contact the Chairman of the Board of Aldermen with a view to expressing his opinion on the code and supplying the Board with as much information as possible, so that the final code would be workable.

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April 23—E. Gygax gave a complete report on the advancement made by the Code Committee, and assured everyone present that every effort was being made to secure a satisfactory code before the dead line date of May 15. He stated that the efforts of interested parties had resulted in the removal of the proposed code from the pending building code, and that the next step was to replace this with one that is workable and without stringent regulations that might tend to stifle the industry in St. Louis.

The all-color motion picture entitled, "The Manufacture of Virginia Smelting Refrigerants" was then shown and very much enjoyed. The local representative, Mr. Arbuckle, was introduced and thanked by the chapter for his cooperation in showing this film. Mr. Arbuckle answered many questions regarding Virginia refrigerants.

NIAGARA FRONTIER CHAPTER

May 1—The greater part of this meeting was devoted to the business of the chapter, and to the reports, plans, and work being done by the various committees in charge of activities of the Annual Banquet. Elaborate plans are being made, and there is much to be done. Due to a lack of time, the educational feature for the evening was omitted.

LONG BEACH CHAPTER

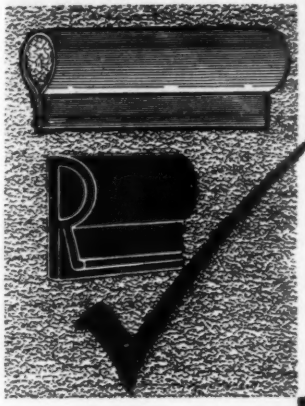
May 2—This was a dinner meeting, held in the Imperial Cafe, furnished by the Bedell Engineering Company, through the cooperation of the Allied Refrigerating Company, of which Mr. William Crofoot is manager.

The educational program of the evening included a very interesting talk by Mat Fugle on the new Bedell Zephyr Circular Blower Coil, and other products manufactured by the company. There were many guests present for the evening, and several added helpful remarks to the evening's pleasure.

A business session was conducted following this educational period.

KANSAS CITY LADIES AUXILIARY

The meetings of April 9, 17, and 23 were devoted primarily to the arrangements for a forthcoming bazaar, and to plans for the Golden Spike Celebration, to be held May 2, in which the ladies were planning to par-



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ticipate. It was decided that prizes would be awarded by the Auxiliary to the best dressed couple in costume.

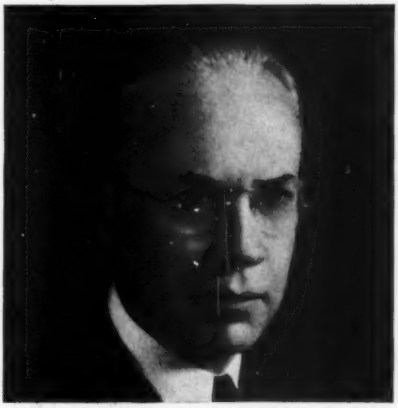
The Golden Spike Celebration was held on May 2 and all business was dispensed with. Forty persons were in attendance. Moving pictures of the Chicago Convention were shown, and prizes were awarded for the best dressed couple in costume. There were also three door prizes. Bingo was played as a means of entertainment, and lunch was served by the Auxiliary.

* * *

FRANCIS M. COCKRELL

THE refrigeration industry learned with regret of the death of F. M. Cockrell, founder and publisher of Air Conditioning and Refrigeration News, and President of the Business News Publishing Company, on Sunday, May 26, in Grace Hospital, Detroit. His death followed an operation on May 10, and services were held at Fort Madison, Iowa on May 29.

Francis Marion Cockrell was 58 years old, and enjoyed a wide acquaintanceship in the refrigeration industry since he founded the Electric Refrigeration News in September, 1926, which was later changed to Air Conditioning and Refrigeration News. Mr. Cockrell was an energetic individual and



FRANCIS M. COCKRELL

had a full and diversified life. His early experience included among other things an interest in electronics, working as a telephone installer and subsequently operating

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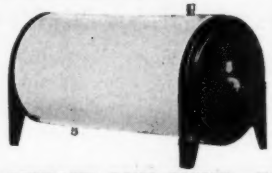
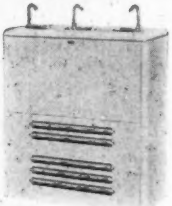


Model CE-25 INSULATED TANK COOLER with 25-gallon storage, cools 20 G.P.H. from 80°F. to 50°F. with 32°F. refrigerant. Other models for an infinite number of installations are available from 9 to 1008 G.P.H. capacity.

Model DU2-1 SELF CONTAINED TYPE DRINKING FOUNTAIN CABINET COOLER with 1¾-gallon storage, cools 9 G.P.H. from 80°F to 50°F. with 32°F. refrigerant. Other models are available up to 77 G.P.H. capacity with many bubbler arrangements for self-contained and remote type installations.



Model RU25-3 SELF CONTAINED TYPE RESTAURANT COOLER with 25-gallon storage, has three glass fillers and cools 20 G.P.H. from 80°F. to 50°F. with 32°F. refrigerant. Other models with many glass filler arrangements are available with capacities from 10 to 77 G.P.H. for both self-contained and remote type installations.

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his own business as an independent electrical contractor. He received his B.S. degree in Electrical Engineering in June, 1914 from the University of Illinois, and was a popular member of many of the University Fraternities.

Before receiving his college degree, he served as a high school superintendent at Dallas, Illinois, and after marrying Margaret Benbow and graduating from the University, he joined the Westinghouse Electric and Manufacturing Company, later becoming affiliated with McGraw-Hill Company, thus acquiring an interest in the publishing business. Later, he left McGraw-Hill Company to join the Campbell-Ewald Advertising Agency, where he was instrumental in establishing an industrial advertising division. Subsequently, he was identified with the Society for Electrical Development, and then he went to Evans-Winter-Hebb, Detroit, where he was Vice President in Charge of Sales.

Mr. Cockrell was active in the affairs of the American Society of Refrigerating Engineers, and his fraternal affiliations consisted of the A. F. & A. M. and R. A. Masons. He was a member of the Baptist Church, the Republican Party, and the Detroit Golf Club.

He is survived by his widow Margaret B., and daughter M. Helen.

Mr. George Taubeneck who has been identified with the "News" since 1929 succeeds Mr. Cockrell as Publisher and Editor.

PHIL PIERCE DECEASED

MEMBERS of the Lone Star Chapter, Dallas, Texas, regret to announce the death of one of their members, Mr. Phil Pierce, who passed away May 30.

The chapter joins the many friends of Mr. Pierce in extending sincere sympathy to his family and loved ones during this time of sorrow.

MR. AND MRS. H. M. THOMPSON MEET UNTIMELY DEATH

THE many friends, relatives, and the entire membership of the Long Beach Chapter are grieving over the sudden and violent death of the highly esteemed Howell M. Thompson and his wife, Lilly B. Thompson. Mr. and Mrs. Thompson were killed Sunday, May 5, when their car collided with that of an unemployed truck driver on the

San Fernando Road in the San Fernando Valley. Both died without regaining consciousness in the emergency hospital.

Both Mr. and Mrs. Thompson were born in Iowa, but have lived in Long Beach for the past ten years, where Mr. Thompson has operated his own business. He has been engaged in refrigeration work since 1926, part of which time, he spent in the employ of Frigidaire. He was a charter member of

Mr. and Mrs. H. M. Thompson, deceased

the Long Beach Chapter, and has been an ardent supporter of the chapter ever since. He was widely known in his work, and was loved by all who knew him.

Survivors are a son, Donald, also a member of the Long Beach Chapter, a daughter, Mrs. M. J. Williams, of Long Beach, and three grandchildren.

S S S

MUELLER BRASS CONDUCTS SOLDERING CONTEST

THE Lifsey Distributing Company, Flint, Michigan, on May 2, were sponsors of a soldering contest conducted and designed by Mueller Brass Company.

This month's front cover and Fig. 1 shows two groups of the contestants at work during the contest. Those on the front cover, from left to right, are: N. Gunnell, Clark's Refrigeration Service, Flint; C. H. Morgan, Appliance Service, Flint, Winner of the contest; W. L. Henderson, Lifsey Distributing Company, looking on; Owen Dobbs, McDonald Dairy, Flint; Bill Baer, White Gold Ice Cream Company, Flint.

The project in the contest is to assemble

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★ For over a year now our jobbers have supplied Herveen to service men all over the country. Many of these have written us and told of business which formerly they had been forced to turn down, now brought them increased profits, as well as enabling them to offer a more complete service. Leading parts jobbers throughout the country now stock Herveen. If yours doesn't, write us direct.

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and solder the loop shown in Fig. 2. Each contestant is furnished with the necessary materials and equipment including the prefabricated base and riser assembly.

Fig. 1—In this group of contestants (left to right) are V. Dengman, Saginaw, Mich., Bill Lott, Ernst Chasteen, and Otis Chasteen of Flint, Mich.

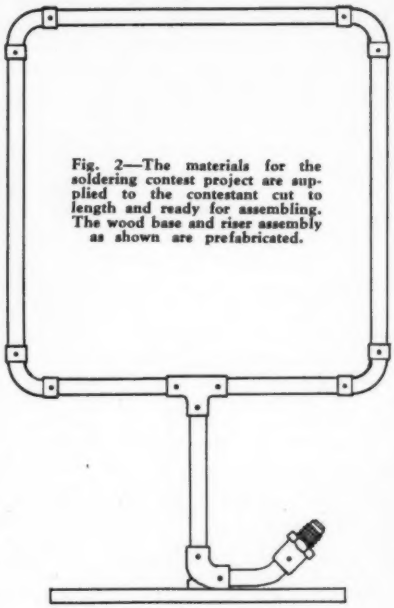

Fig. 2—The materials for the soldering contest project are supplied to the contestant cut to length and ready for assembling. The wood base and riser assembly as shown are prefabricated.

Rules

A. Contestant may not touch any materials prior to starting signal.

B. All parts must be soldered after assembly to the project. Base must be kept upright and in one position throughout assembly operations. Contestants may not turn project around or to one side, and must do all work

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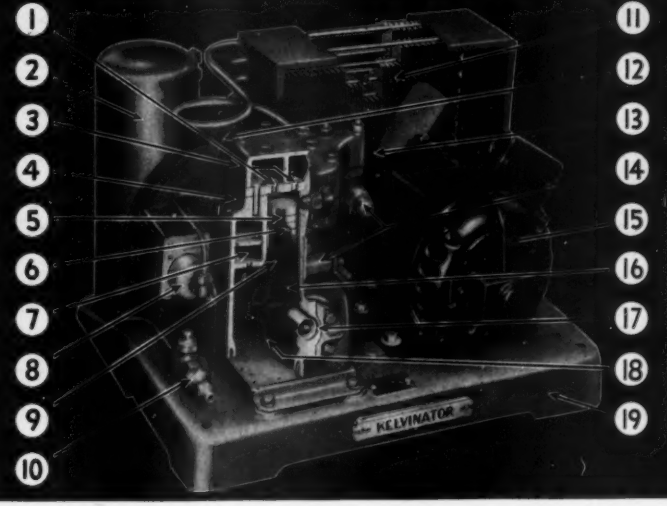

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5. Pistons, selectively fitted.
6. Piston Pins, chrome nickel steel.
7. Suction Chamber, no oil slugging.
8. Pressure Controls.
9. Connecting Rods with extra large bearing surface on crankshaft.
10. Liquid Line Valve, easily reached.
11. Condenser, continuous tube type.
12. Compressor Pulley, well balanced.
13. Drive, V-type moulded belt.
14. Service Valves, two way type, with gauge connections.
15. Motor, heavy duty refrigeration.
16. Crankshaft, extra heavy, heat treated, drop-forged steel with ground finish.
17. Main crankshaft bearings, leaded bronze, with large diameter and surface, diamond bored and grooved for perfect lubrication.
18. Lubrication, crankshaft and connecting rod bearings by oil bath; piston and piston pin by oil splash.
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RS23	15¼"	1⅞" x 9⅞"	2.18	1.97

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from same relative position.

C. All joints must be cleaned and fluxed satisfactorily prior to soldering.

D. Contestants may solder as they assemble, or may assemble complete, then solder.

E. On completion, each assembly to be tested for leaks under supervision of judges.

Judging Based on Following Points

A. Elapsed time in seconds.

B. For each joint not filled with sufficient solder—penalty 15 seconds.

C. For each joint not neat, such as solder running down tube, penalty is 5 to 15 seconds.

D. For each joint that leaks—penalty 80 seconds.

E. Squareness of completed project, penalties—60 seconds maximum.

F. Contestant with lowest total time adjudged winner.

The contestants are permitted to use any kind of torch they prefer, and it is interesting to note that the winner was one of the only two using a blow torch.

LOS ANGELES CONSIDERING NEW LICENSING ORDINANCE

THE draft of a city ordinance making it mandatory for every refrigeration service engineer to carry a license and providing for examination of all applicants has been submitted to A. B. Wicks, director of the Heating, Ventilating and Refrigeration Division of the Los Angeles Bureau of Building and Safety, with a recommendation for its submission by Mr. Wicks to the Bureau for passage.

Sponsor and co-author of the proposed ordinance is Frank Gillette, secretary of Los Angeles Chapter of the Refrigerating Service Engineers Society. The ordinance, in its essential points, is based on a similar one now in force in Long Beach, Calif.

Supporting the movement for enactment of the measure are various interests who for several months have importuned the Building and Safety Department for more vigorous action against refrigerating service contractors operating without a license. Since 1933 the city of Los Angeles has had an ordinance requiring registration and licens-

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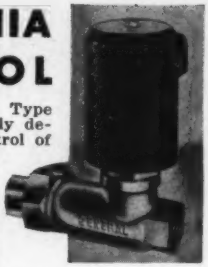

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List Price, K-10-7, 16 ton capacity..$16.00
List Price, K-10-8, 50 ton capacity, identical with above, only equipped with #300 solenoid $32.00

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GENERAL CONTROLS
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450 E. Ohio St. Chicago, Illinois

ing of contractors. The movement for stricter enforcement of the contractors' ordinance ultimately culminated in a request that service men also be subjected to stricter supervision. A suggestion by Mr. Wicks that the request and its provisions be put in the form of an ordinance resulted in the recent submission of a proposed ordinance to the Heating, Ventilating and Refrigeration Division.

Action on the matter has been delayed because the proposed ordinance, in its submitted form, is regarded as requiring too severe an examination.

* * *

POWER LOSS DUE TO POOR GASKETS

THE importance of door gaskets as an additional source of revenue for service engineers was emphasized in an interview with H. W. Jarrow, President of Jarrow Products Corporation, Chicago.

"Since door gaskets contribute so much to the efficiency of a refrigerator," he said, "the service man, whose business is good refrigeration, will find it profitable to check gaskets on every job.

"While new equipment is properly gasketed by manufacturers, the continued use of equipment in time reduces efficiency of the gasket seal," he said. "Consequently, the flow of heat into a refrigerated space is less restricted."

In support of this statement, Mr. Jarrow cited a recent test which he had made, which produced a 29 percent reduction in power cost. In this test, the following factors were considered:

(A) Outside temperature.
(B) Inside (cooling room) temperature.
(C) Electric current used.

In this particular room a temperature of 38 degrees F. was desired. A twenty-four hour test run with a mean temperature of 71.8 degrees F. outside showed that the inside temperature could not be brought down below 43.4 degrees F. with the refrigerating machine running continuously. The door was opened 114 times during the test and the windows not at all.

The doors and windows were then properly gasketed and another twenty-four hour test run. The results were astonishing. The outside mean temperature was 71.2 degrees F. (approximately the same as in the pre-

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vious test); inside temperature ranged from 37.1 degrees F. to 38.2 degrees F. during the entire twenty-four hours; doors opened 119 times and windows four times during the test. With proper gasketing the heat flow into the room was considerably reduced and the capacity of the condensing unit was found to be ample.

"Watch gaskets and replace them when necessary," said Mr. Jarrow. "This is especially true of the older types of refrigerators. Gaskets have been and are being constantly improved so that they will do an efficient job for a longer time.

"The condition of the gaskets should always be checked, and if they do not seal well, replacement is in order because unsatisfactory refrigeration may often be much improved in this manner."

S S S

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THE Fedders Manufacturing Co., Buffalo, N. Y., feels sure that men throughout the refrigeration trade in Cincinnati area will be glad to know that Henry ("Hank") Sherman has returned to take charge of Fedders Cincinnati headquarters. He has established a host of friends throughout the territory because of what he knows as well as whom he knows.

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HENRY SHERMAN

Henry is an old timer with the Fedders organization and its various refrigeration appliances and consequently knows the line from A to Z.

For more than twenty years Mr. A. E. ("Ed") Walsh has been directly connected with refrigeration, heating and ventilating

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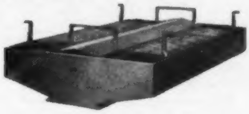

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both in the selling and in the contracting business.

"Ed" is well known to refrigeration and service engineers for his practical knowledge and wide international experience gained from representing leading manufacturers in both the States and Canada. He has a reputation of selling the exceptionally high quality refrigeration products and to continue this reputation he is representing Fedders Refrigeration Products in the Province of Ontario, which includes Toronto, Hamilton, London, etc.

x x x

A-P MODEL 270 SOLENOID VALVE

DESIGNED for both liquid and suction line applications, the new Model 270 solenoid refrigerant valve, introduced by the Automatic Products Company, Milwaukee, offers an entirely new departure in solenoid valve construction. It can be used on Freon, methyl chloride or sulphur dioxide systems.

The Model 270 is "over-powered," lifting against rated pressure at 85 percent of rated voltage. Pilot operation provides increased capacity and simple, positive action.

Advanced engineering principles which have been incorporated in this valve have made it possible to do away with plunger vibration, providing absolutely quiet operation at all times. This feature has been accomplished by means of a three-point stop used in conjunction with a shading coil. The shading coil is a shorted electrical conductor in the magnetic path, which creates a magnetic flux out of phase with the original flux. This out-of-phase flux set up by the shading coil breaks up the plunger pulsations of the alternating current by holding the plunger rigid during the zero period of the voltage cycle. Since all other parts of the plunger have clearance to prevent contact with stationary pieces, this provides perfect plunger stability during the period that the coil is being energized. Plunger pulsations are generally recognized as the usual cause of valve rattle.

The manner in which inlet and outlet connections have been offset has made it possible to eliminate restriction of the refrigerant flow almost entirely, thereby increasing the capacity of the valve at a given pressure drop.

Operation of the valve is simple. In the closed position, pressure leaks past the piston and holds the valve tightly shut. When

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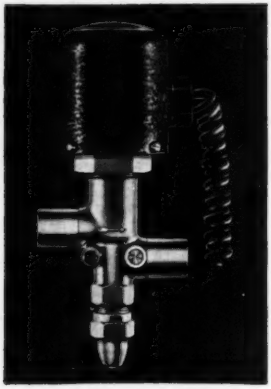
current passes through the coil, the magnetic field pulls the plunger up part way. This opens the pilot port, which allows the pressure to leak through the low pressure



A-P MODEL 270 VALVE

side. With a reduced pressure above the piston, the pressure below it opens the main port valve. The travel of the plunger does not stop at this point, however, but continues to move upward. Upon reaching the maximum of its travel, it holds the piston away from the port opening so that there is actually no pressure drop required to hold the valve open.

The valve has a dense forged brass body to insure against leakage, while internal parts are either brass or stainless steel to prevent corrosion. Neoprene discs are used for both pilot and main valve seats; this prevents leakage and provides an absolutely tight seal-off. Plunger and piston assembly are one complete unit.

There are several applications of this valve, foremost of which is its use to control the flow of refrigerant to individual evaporators, connected to the same compressor unit.

S S S

BOOK REVIEW

An Air Conditioning Primer. By William Hull Stangle. Published by McGraw-Hill Book Company, Inc., New York. 236 pages. Cloth binding. Price, $2.50. For sale by The REFRIGERATION SERVICE ENGINEER, 433 N. Waller Ave., Chicago, Ill.

Here is a book which fills a great need, existent since the introduction of air conditioning. A translation of scientific facts

STATOR Rewinding

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and data on what has heretofore been a complicated subject, into simple language, easily digested by those who are not engaged in highly technical vocations. This entire book is written in a manner which makes it easy to absorb the fundamentals and application of air conditioning.

The author, Mr. Stangle has covered the subject in eight chapters, divided into two parts. Part One deals with fundamentals and Part Two, application and apparatus. There are over two hundred illustrations which help to simplify the explanations. More than twenty-five tables provide useful reference data.

NEW BONNEY BOX WRENCHES

TO meet the serviceman's needs for short type box wrenches for work in cramped quarters and with low overhead clearances, Bonney Forge & Tool Works, Allentown, Pa., offers a new series of 15-degree angle wrenches.

Forged of Bonaloy Steel, their heads are at angles of 10 to 15 degrees, depending on the length of the wrench. Either side of the head may be applied. Handles are thin and oval-shaped, affording a firm, comfortable grip. They have double hexagon openings, are fully chrome plated and have polished heads. Light in weight, with thin wall heads, they have that balance found in all fine tools.

MUFFLY SUES PELCO UNDER FLOATING ICE PATENT

IN Civil Action No. 99, filed May 4, 1940, in the United States District Court, Southern Division, Southern District of Illinois at Springfield, Illinois, Glenn Muffly of Springfield, Ohio, seeks an accounting for profits and damages, and an injunction restraining the Portable Elevator Manufacturing Co., of Bloomington, Illinois from further infringement of United States Patent No. 2,145,778, issued to Glenn Muffly under date of January 31, 1939, on his application filed November 8, 1933.

This patent relates to the "floating ice"

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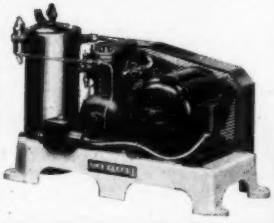

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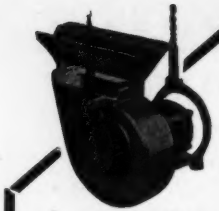

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type of refrigerating equipment. The complaint refers to claims 6, 7, 8, 9, 14, 15, 16, 17, 18, 19, 21, 22, 23, 24, 25, 26 and 27 of the above patent and to the "Pelco Beverage and Food Coolers with Floating Ice" made by Portable Elevator Mfg. Co.

KELVINATOR NEW PROGRAM BRINGS SALES INCREASE

WITH sales of its new 1940 electric refrigerators running more than double those of last year, the Kelvinator Division of Nash-Kelvinator Corporation in 1940 is experiencing the greatest unit-volume year in its history, it was reported this week by Frank H. Pierce, Kelvinator's general sales manager.

Pierce told Kelvinator and Leonard distributors who gathered in Detroit Monday and Tuesday for a special summer business meeting that the tremendous impetus given to sales in 1940 was due not only to the company's revolutionary new manufacturing and selling program, but to the splendid selling job that has been done by dealers handling Kelvinator and Leonard electric refrigerators.

"Reports from new dealers as well as old," he continued, "indicate that one of the most important reasons for their increase in sales volume is Kelvinator's logical 'step-up' in models, a vital factor in the new manufacturing and selling program.

"With gradual increases in price and additional features justifying each price 'step-up,' our retailers have found it a simple matter to 'sell-up' buyers who otherwise would have been prospects for only the lowest-priced models."

Pierce told those attending the meeting that the vast increase in business had made it necessary for Nash-Kelvinator Corporation to up production schedules four times since the beginning of the year.

NEW PACIFIC COAST JOBBERS

TWO new refrigeration parts distributors have recently been established on the Pacific Coast. At Sacramento, California, the Associated Refrigeration and Equipment Company has established a place of business at 1717 I Street, and will operate as a wholesale refrigeration supply department, maintaining a stock of domestic and commercial

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Pressure-actuated, renewable seat, ⅜", ½" ¼" pipe fittings.

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air conditioning and other industrial parts, supplies, and equipment. The personnel of the new company includes Messrs. Tom Dunn, Claude Baker, and Bill Aitken.

At Los Angeles, California, Mr. Hal Clay, formerly of Dole Refrigeration Company, has established the Authorized Supply Corporation, at 1437 South Los Angeles Street, and the formal opening of the new company was held on May 25.

MIDWEST JOBBERS TO MEET

THE Midwest Refrigeration Supply Jobbers Association, consisting of jobbers from Kansas City, Lincoln, Omaha, Des Moines, Sioux City, Waterloo, Minneapolis, and other strategic points in Iowa and the surrounding states will hold their meeting in Davenport at the Hotel Blackhawk on June 24th.

A combined meeting in the afternoon, which will be open to the manufacturer's representatives, will be held at the country home of Mr. J. S. Kimmel, President of the Republic Electric Company, Davenport, Iowa.

NEW CATALOGS AND BULLETINS

REFRIGERATION SERVICE, INC., 3109 Beverly Blvd., Los Angeles, Calif. Catalog No. 11 contains 236 pages of standard refrigeration equipment and service supplies, carefully compiled and conveniently indexed. As in the past, the catalog is 6x9 inches in size, substantially bound in patented wire binding.

REMPE COMPANY, 340 North Sacramento Blvd., Chicago, Ill., has issued a 76-page catalog on finned coils, bare pipe coils, unit coolers of all types, and ammonia coils for all classes of work.

In addition to providing an unusually complete listing of coils of a type and capacity to meet every requirement, the catalog explains the method of calculating coil requirements.

Your copy may be obtained by writing the company direct.

HARRY ALTER CO. "In announcing our new Summer 1940 Dependabook, we particularly want to call attention to the back

Classified Ads

Rate: Two Dollars for fifty words or less. 30 cts. for each additional ten words or less.

POSITION WANTED — Experienced Service Engineer with experience in installation and maintenance of refrigeration equipment, technical training and sales experience. Desires connection as salesman, estimation engineer or installation engineer. Location immaterial. Details given upon request. Now employed. Address Box 108, REFRIGERATION SERVICE ENGINEER, 435 N. Waller Ave., Chicago, Ill.

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FOR SALE—Brand new high-sides, complete with ⅓-h.p. 110-volt a-c Stewart-Warner hermetic sealed compressors for top or bottom mount refrigerators. Factory tested. Price $18.00 each, Chicago. While stock lasts. G. & E. Brokerage Co., 444 West Grand Ave., Chicago, Ill.

FOR SALE—Quantity of rebuilt Penn one-button domestic cold controls, like new, with front plates. Price in lots of 10—$1.35 each, f.o.b. Chicago. Also quantities of Chieftain compressors, belts, motors, valves, etc. G. & E. Brokerage Co., 444 West Grand Ave., Chicago, Ill.

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cover, where we offer for the first time a definite and practical merchandising plan to the service organization.

"We have designed a series of nine streamers suitable for use on display windows, cars and trucks, which give concrete selling messages on refrigeration and air-conditioning installation and service. These signs help to guide the consumer to the logical place to have repairs, inspections and installations made in regard to refrigeration work. These sets are furnished at a nominal cost of $1.00 or given free with an order of $10.00 or over. We have felt for some time that this kind of assistance to the serviceman will prove beneficial and result in increased business for the man who uses them.

"Our Summer 1940 catalog contains many new items recently introduced. Price revisions have been put into effect, wherever possible, making our Dependabook more than ever a complete buying guide. The size was increased to 148 pages to take care of the numerous additions.

"Maintaining 12 completely stocked warehouses, we are in a position to make available all parts, tools and supplies instantly and our improved shipping facilities make it possible to dispatch material in practically all cases the same day as orders are received."

BRASS & COPPER SALES COMPANY, St. Louis, Missouri, have recently issued a complete up-to-date 212 page air conditioning and refrigeration supplies and equipment catalog. This new catalog contains the latest and newest items in the air conditioning and refrigeration field. During the past year the company has added many new items to their stock. Considerable additional counter space has been provided for customers calling at the refrigeration counter. The company has also increased office spaces and are installing an air conditioning system. A delivery truck and motorcycle have been purchased to better serve the refrigeration trade and additional personnel has been added to the engineering and estimating department.

H. CHANNON COMPANY, 201 E. N. Water Street, Chicago, Illinois, are pleased to announce that their 1940 refrigeration and air conditioning catalog may be secured at your request.

This catalog contains 120 pages of nationally known supplies and is backed by the greatest resources of any supply house

in the country. This catalog was carefully compiled to meet your requirements. You will find it complete in every respect. All of the latest items are featured. We continue to give you full protection by showing list prices. You may use this catalog to sell your customers without having to conceal the prices.

IMPERIAL BRASS MFG. CO., 1200 W. Harrison St., Chicago. A complete range of welding and cutting torches and outfits, soldering outfits, gas and air torches and lead burning equipment is described in a new 28-page booklet just issued.

Shown for the first time in this booklet is the new, economical Imperial 7X Welding Torch which is especially recommended for welding sheet metal, for auto body and fender welding and for airplane welding.

In addition the booklet shows Imperial regulators, regulator adapters, welding hose, hose connections, cylinder trucks, goggles, gloves and other supplies. Copies of this booklet, which is designated No. 571 and is of a convenient 6¼ x 3¼ inch size, may be obtained by writing to the manufacturer.

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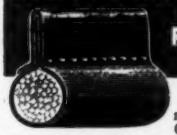

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